CONTROLLER MANUAL

SPINCHILLER C.D.A

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CLIVET TALK LOCAL INTERFACE

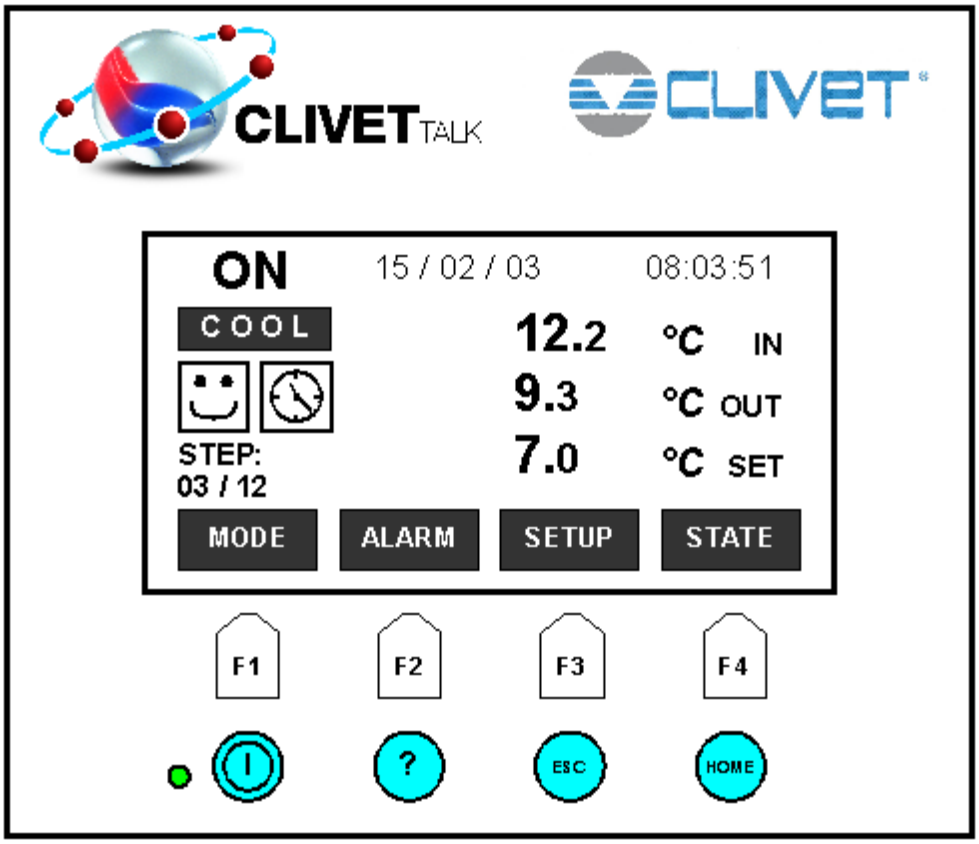
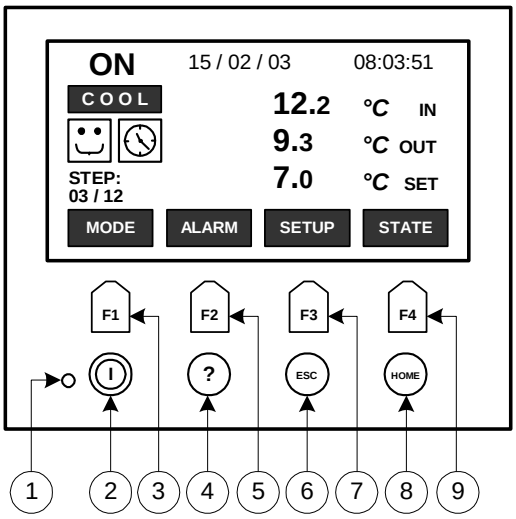


Figure 1
Clivet code C5110612

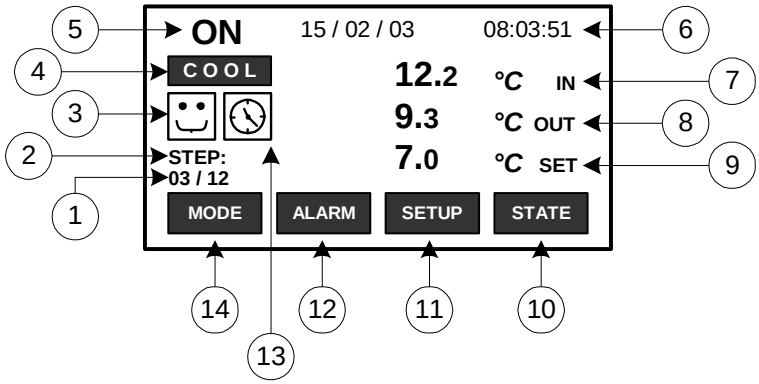
Figure 1 represents the layout of the control keypad corresponding to the ClivetTalk modular control system. The functions of the buttons and the meaning of the configuration screens are described below.

DESCRIPTION OF THE BUTTONS



NUMBER	SYMBOL	MEANING
1	● ○	LED = on when unit ON LED = off when unit OFF
2	⏻	"**ON-OFF**" button: holding this for at least 3 seconds turns the unit on or off
3	F1	**F1** = Button that runs the associated function indicated in bold, "**MODE**"
4	?	"HELP" button: depending on the menu selected, pressing this button provides brief descriptions to help the user interpret the parameters, status variables and alarms
5	F2	**F2** = Button that runs the associated function indicated in bold, "**ALARM**"
6	ESC	"ESC" key: when navigating the menus, this key can be used to go back to the previous screen
7	F3	**F3** = Button that runs the associated function indicated in bold, "**SETUP**"
8	HOME	"**HOME**" button: during navigation, returns to the main menu from any screen
9	F4	**F4** = Button that runs the associated function indicated in bold, "**STATE**"

DESCRIPTION OF THE MAIN SCREEN

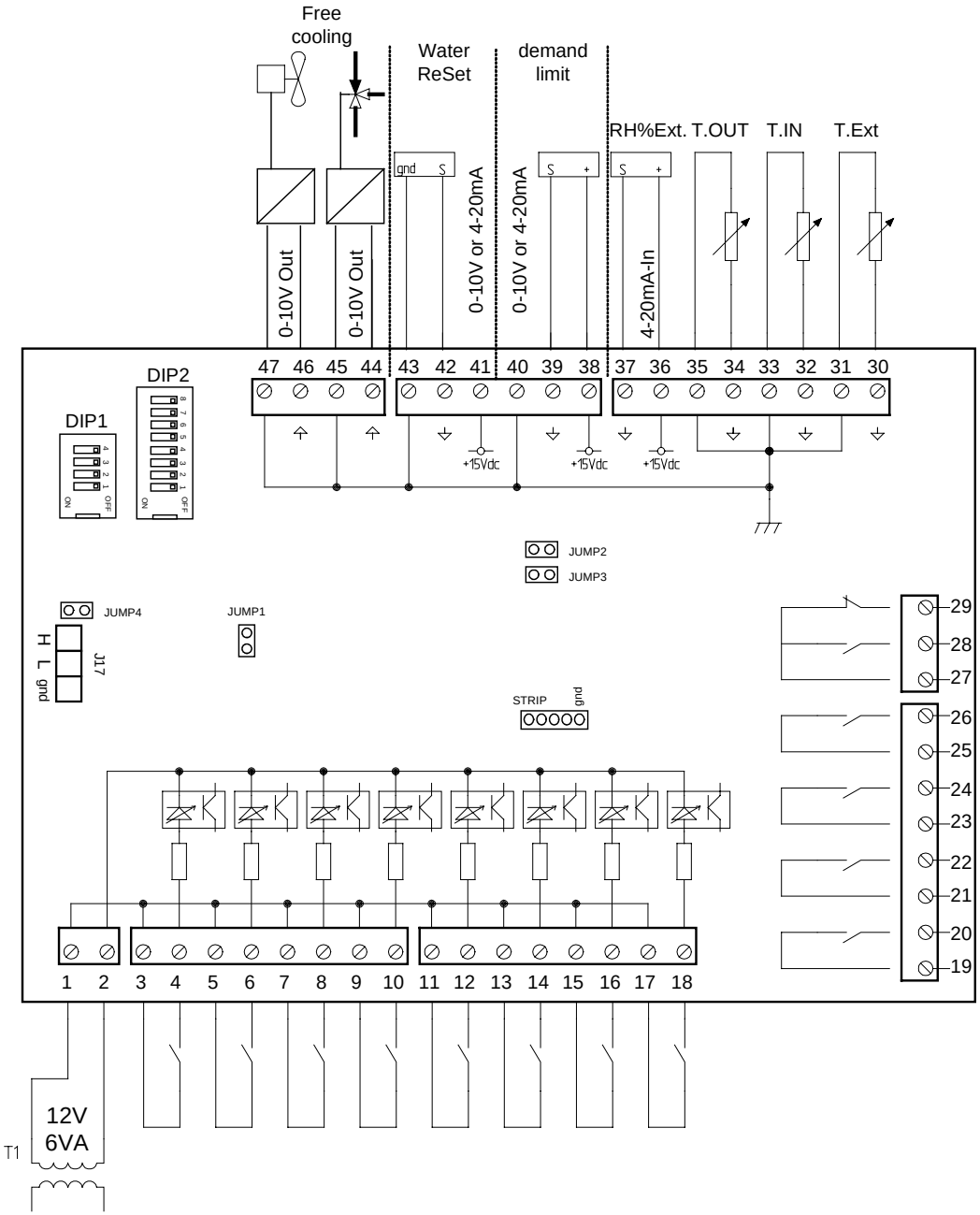


NUMBER	SYMBOL		MEANING	
1	00/00		No. of steps activated in reference to the no. of steps available	
2	STEP		Capacity-control steps	
3	☺	⚠	No alarm active	Indication of active alarms
4	COOL	HEAT	Unit operating in Cool mode	Unit operating in Heat mode
5	ON	OFF	Unit on	Unit off
6	15/02/03 08:03:51		Display the actual date and hour	
7	00.0 °C		Inlet temperature	
8	00.0 °C		Outlet temperature	
9	00.0 °C		Actual set-point	
10	STATE		**STATUS** button: accesses the unit status menu	
11	SETUP		**SETUP** button: used to access to the menu for setting the unit parameters, the clock and the time bands	
12	ALARM		**ALARM**: allows access to the alarms menu	
13	☐	🕒	Time bands disabled	Time bands enabled
14	MODE		**MODE**: if selection of the operating mode from the keypad is enabled, the unit can be switched between operating modes (heat, cool). The mode can be changed only when the unit is “OFF”, by pressing and holding the key for at least 3 seconds	

SYSTEM COMPOSITION
The Clivet Talk modular system is made up of the following modules, which can communicate with each other over the local network:

- Central module (Code = C5110671)
- Evaporator module (Code = C5110674)
- Trio module(Code = C5110672)
- Tandem module (Code = C5110673)
- Clivet Talk keypad (Code = C5110612)

CENTRAL MODULE *CLIVET*TALK.LOCAL.M1



DESCRIPTION OF THE JUMPERS

DIP1			To be defined	
DIP2			Board address for CAN BUS	
JUMP1			**Reset board** (jumper for normal operation)	
JUMP2			programming (jumper for programming)	
JUMP3			programming (jumper for programming)	
JUMP4			CAN Bus terminator (jumper for insert terminator)	
STRIP			Programming strip (pin sequence) • +5V • TX board • RX board • DTR • gnd	

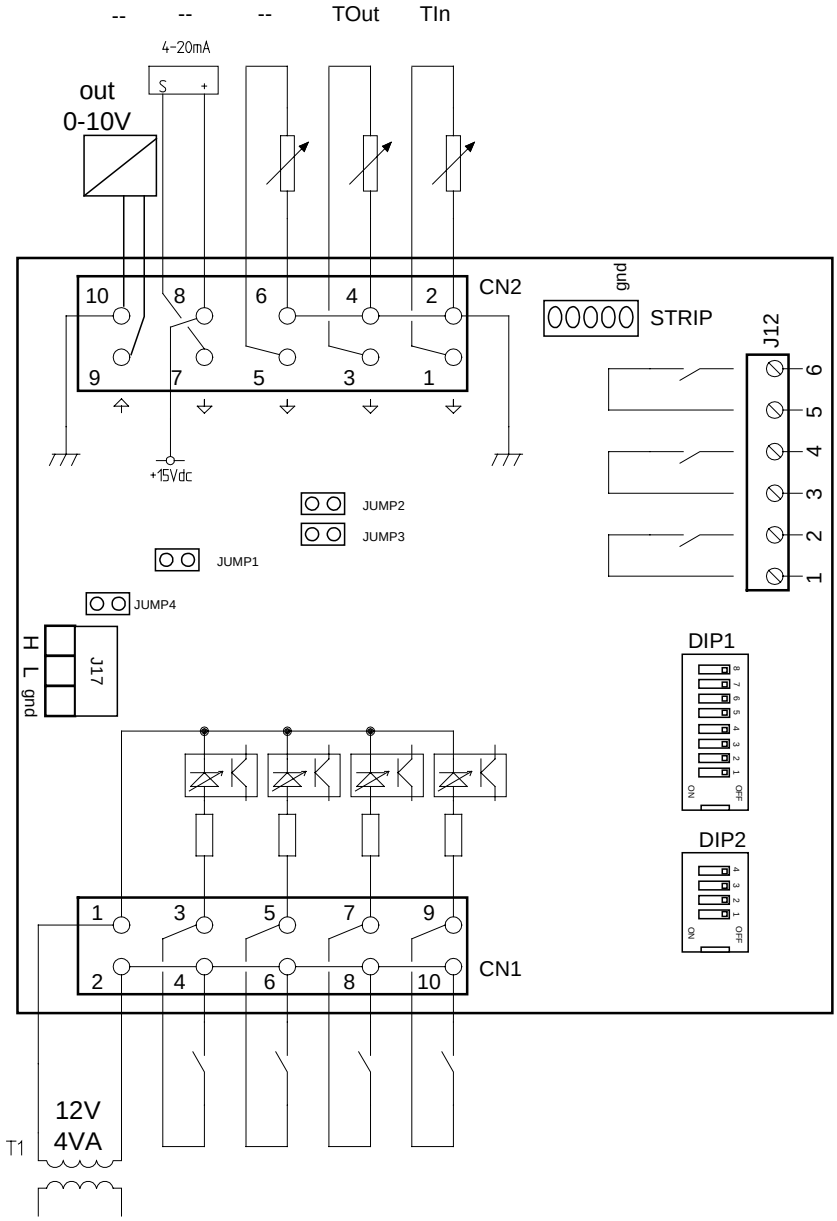
Connection of the digital inputs

I/O CLIVETTALK.LOCAL.M1

Connector	Pin	Terminal	Description	Note
J6	J6-1	**1**	12Vac power (common)	Max. 6VA
	J6-2	**2**	12Vac power (reference)	
J1	J1-1	**3**	12V power (common)	Max. 10mA for each input
	J1-2	**4**	Remote On-Off input	
	J1-3	**5**	12V power (common)	
	J1-4	**6**	Remote Heat-Cool input	
	J1-5	**7**	12V power (common)	
	J1-6	**8**	Select second set point input	
	J1-7	**9**	12V power (common)	
	J1-8	**10**	Mains monitor input	
J2	J2-1	**11**	12V power (common)	
	J2-2	**12**	Flow switch input	
	J2-3	**13**	12V power (common)	
	J2-4	**14**	Protector input pump 1	
	J2-5	**15**	12V power (common)	
	J2-6	**16**	Protector input pump 2	
	J2-7	**17**	12V power (common)	
	J2-8	**18**	Check system pressure input	
J16	J16-1	**19**	Relay 1 input	5A-250V AC1
	J16-2	**20**	Relay 1, (pump 1 control signal)	
	J16-3	**21**	Relay 2 input	
	J16-4	**22**	Relay 2, (pump 2 control signal)	
	J16-5	**23**	Relay 3 input	
	J16-6	**24**	Relay 3, free	
	J16-7	**25**	Relay 4 input	
	J16-8	**26**	Relay 4, (freecooling control signal)	
J7	J7-1	**27**	Relay 5 input	
	J7-2	**28**	Relay 5 NO, Cumulative alarms	
	J7-3	**29**	Relay 5 NC, Cumulative alarms	

Connector	Pin	Terminal	Description	Note
J17	J17-1	**H**	CAN OPEN	
	J17-2	**L**		
	J17-3	**GND**		
J18	J18-1	**30**	NTC input, outside air temperature	NTC 10K=25°C
	J18-2	**31**	Gnd	
	J18-3	**32**	NTC input, water temperature OUT 1	
	J18-4	**33**	Gnd	
	J18-5	**34**	NTC input, water temperature IN	
	J18-6	**35**	Gnd	
	J18-7	**36**	+15V	4-20mA
	J18-8	**37**	4-20mA input, outside RH%	
J19	J19-1	**38**	+15V	4-20mA or 0-10V from parameter
	J19-2	**39**	Demand Limit input	
	J19-3	**40**	Gnd	
	J19-4	**41**	+15V	4-20mA or 0-10V from parameter
	J19-5	**42**	Water reset input	
	J19-6	**43**	Gnd	
J20	J20-1	**44**	Freecooling proportional valve output	0-10V
	J20-2	**45**	Gnd	
	J20-3	**46**	Ext Free Cool proportional vent. output	0-10V
	J20-4	**47**	Gnd	

EVAPORATOR MODULE *Clivet*Talk.local.ex1



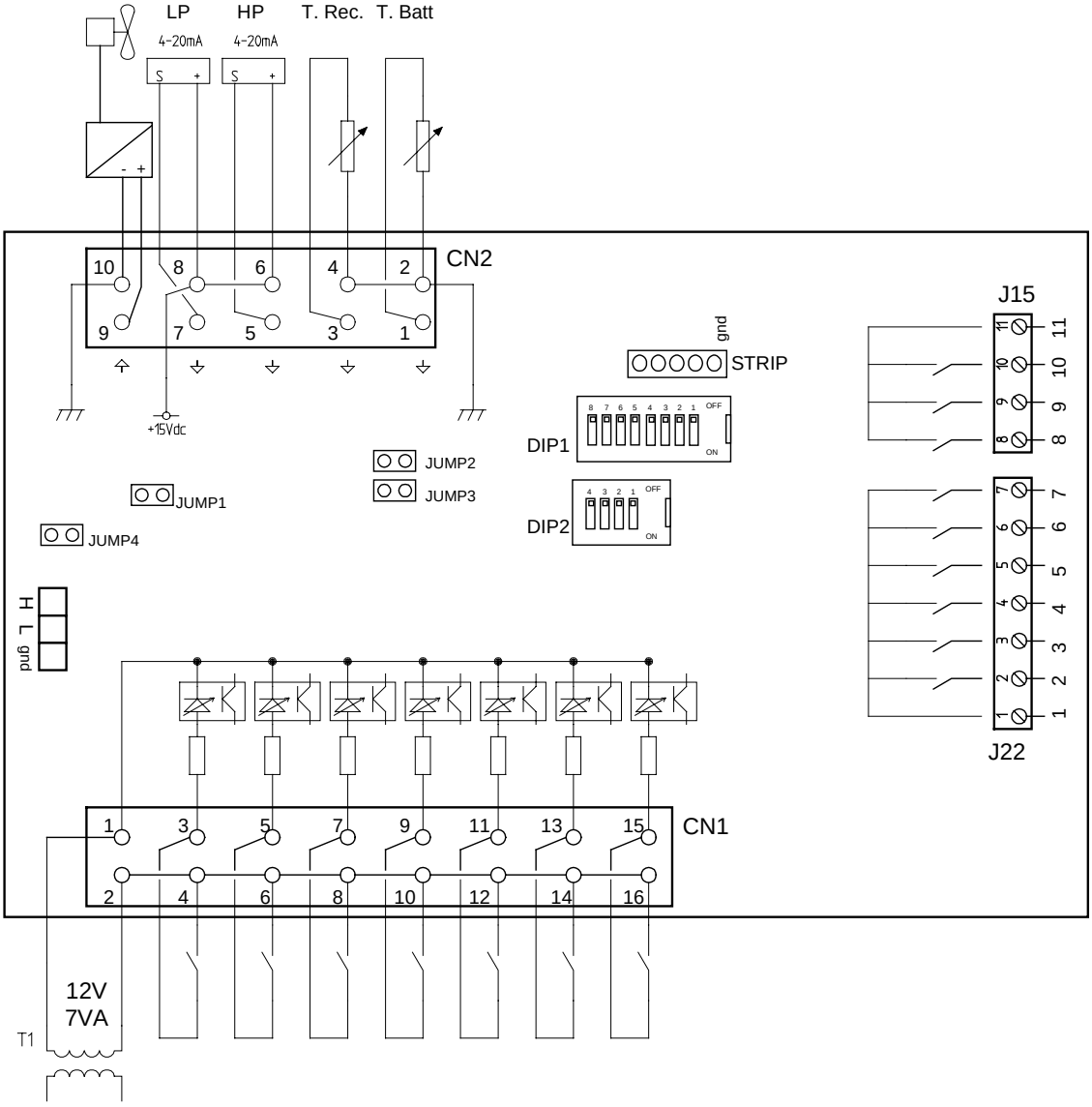
DESCRIPTION OF THE JUMPERS

DIP1			To be defined	
DIP2			Board address for CAN BUS	
JUMP1			**Reset board** (jumper for normal operation)	
JUMP2			programming (jumper for programming)	
JUMP3			programming (jumper for programming)	
JUMP4			CAN Bus terminator (jumper for insert terminator)	
STRIP			Programming strip (pin sequence) • +5V • TX board • RX board • DTR • gnd	

I/O CLIVETTALK.LOCAL.EX1

Connector	Pin	Terminal	Description	Note
CN1	CN1-1		12Vac power	Max. 4VA
	CN1-2		12Vac power	
	CN1-3		Differential pressure switch	Max. 10mA for each input
	CN1-4		12V	
	CN1-5		Check system charge	
	CN1-6		12V	
	CN1-7		Safety devices pump 1	
	CN1-8		12V	
	CN1-9		Safety devices pump 2	
	CN1-10		12V	
CN2	CN2-1		Water inlet temperature NTC	NTC
	CN2-2		Gnd	10k=25°C
	CN2-3		Water outlet temperature NTC	
	CN2-4		Gnd	
	CN2-5		Configurable NTC	
	CN2-6		Gnd	
	CN2-7		Configurable 0-10 or 4-20	Hardware setting
	CN2-8		VRdd	
	CN2-9		0-10V output	0-10V
	CN2-10		Gnd	
J4	J4-1	**1**	C	5A-250V
	J4-2	**2**	Antifreeze heater control signal	AC1
	J4-3	**3**	C	
	J4-4	**4**	Pump 1 control signal	
	J4-5	**5**	C	
	J4-6	**6**	Pump 2 control signal	

TANDEM COMPRESSOR MODULE *CLIVET*TALK.LOCAL.C2
TRIO COMPRESSOR MODULE *CLIVET*TALK.LOCAL.C3



DESCRIPTION OF THE JUMPERS

DIP1	To be defined
DIP2	**Board address** for CAN BUS
JUMP1	**Reset board** (jumper for normal operation)
JUMP2	**Firmware programming** (jumper when programming)
JUMP3	**Firmware programming** (jumper when programming)
JUMP4	**CAN Bus terminator** (jumper for insert terminator)
STRIP	**Programming strip** • +5V • TX board • RX board • DTR • gnd

CLIVETTALK.LOCAL.C2 AND CLIVETTALK.LOCAL.C3

Connector	Pin	Terminal	Description	Note
CN1	CN1-1		12Vac power	Max. 7VA
	CN1-2		12Vac power	
	CN1-3		Fan protector	Max 10mA for each input
	CN1-4		12V	
	CN1-5		High pressure	
	CN1-6		12V	
	CN1-7		Low pressure	
	CN1-8		12V	
	CN1-9		Compressor 1 protector	
	CN1-10		12V	
	CN1-11		Compressor 2 protector	
	CN1-12		12V	
	CN1-13		Compressor 3 protector	
	CN1-14		12V	
	CN1-15		Free	
	CN1-16		12V	
CN2	CN2-1		Coil temperature probe NTC	NTC 10K=25°C
	CN2-2		Gnd	
	CN2-3		Recovery temperature probe NTC	
	CN2-4		Gnd	
	CN2-5		High pressure transducer	4-20mA
	CN2-6		VRdd	
	CN2-7		Low pressure transducer	
	CN2-8		VRdd	
	CN2-9		Fan control output	0-10V
	CN2-10		Gnd	
J22	J22-1	**1**	Common for the outputs	5A-250V AC1
	J22-2	**2**	Compressor 1 control signal	
	J22-3	**3**	Compressor 2 control signal	
	J22-4	**4**	Compressor 3 control signal	
	J22-5	**5**	Cap. control valve control signal	
	J22-6	**6**	Cap. control valve control signal	
	J22-7	**7**	Cap. control valve control signal	
J15	J15-1	**8**	Liquid valve control signal	5A-250V AC1
	J15-2	**9**	4-way valve control signal	
	J15-3	**10**	Fan control signal	
	J15-4	**11**	Common for the outputs	

INITIALISING THE MODULES
Each module configured and present in the Clivet Talk control system must be recognised by the local network, which needs to know which device it is communicating with.
A series of basic rules must be observed when configuring the system, so as to avoid incorrect settings.

BASIC RULES FOR CONFIGURATION
Each module (central, evaporator, trio or tandem) will be identified by a network address, which must be set using the corresponding dipswitches. The sequence of the addresses is not random, but rather must observe the following rules.

- The address of the central module is always = 25
- The address of the local interface is always = 26
- The address of the remote interface is always = 27
- Modules with no address are not allowed
- The addresses of the modules that make up the same unit must be CONSECUTIVE.
- Each unit can only have one evaporator module (unit configurations are possible without an evaporator module). The system can manage a maximum of 3 evaporator modules.
- Inside each unit, the addresses must be assigned considering the following sequence:
    1. compressor module (trio or tandem)
    2. evaporator module
    3. In essence, the evaporator module must have the highest address inside each unit.
- Each unit can manage a maximum of 3 compressor modules (single, tandem or trio).

SETTING THE HARDWARE ADDRESS

The address of the modules must be set before any other configuration operation

- The local keypad and the remote keypad have no physical address set using the dipswitches
- The address of the central module is set using the combination of the dipswitches DIP2
- The address of the evaporator module is set using the combination of the dipswitches DIP1
- The address of the tandem module is set using the combination of the dipswitches DIP1
- The address of the trio module is set using the combination of the dipswitches DIP1

SETTING THE SOFTWARE ADDRESS
The following parameters are used for the configuration of the system:

UNIT 1

Add	*Code*	*Description*	*Default*
39	***U1_Mcomp1***	Type of compressors, module 1 unit 1	3
40	***U1_RecoverEn1***	Enable recovery, compressor module 1 unit 1	0
41	***U1_Mcomp2***	Type of compressors, module 2 unit 1	3
42	***U1_RecoverEn2***	Enable recovery, compressor module 2 unit 1	0
43	***U1_Mcomp3***	Type of compressors, module 3 unit 1	0
44	***U1_RecoverEn3***	Enable recovery, compressor module 3 unit 1	0
45	***U1_MEvap***	Enable evaporator module, unit 1	1
69	***U1_Weightprobe***	Weight on average Out, unit 1	100
46	***U1_VentilType***	Type of ventilation, unit 1	1

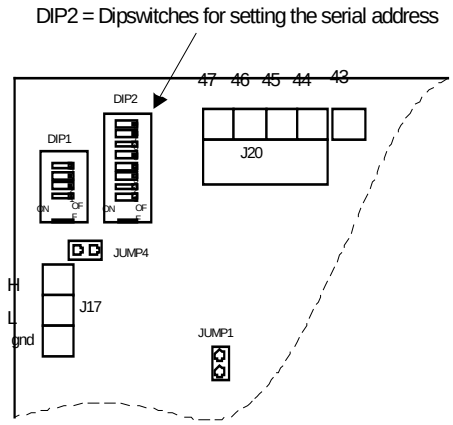
UNIT 2

Add	*Code*	*Description*	*Default*
47	***U2_Mcomp1***	Type of compressors, module 1 unit 2	3
48	***U2_RecoverEn1***	Enable recovery, compressor module 1 unit 2	0
49	***U2_Mcomp2***	Type of compressors, module 2 unit 2	3
50	***U2_RecoverEn2***	Enable recovery, compressor module 2 unit 2	0
51	***U2_Mcomp3***	Type of compressors, module 3 unit 2	0
52	***U2_RecoverEn3***	Enable recovery, compressor module 3 unit 2	0
53	***U2_MEvap***	Enable evaporator module, unit 2	1
70	***U2_Weightprobe***	Weight on average Out, unit 2	100
54	***U2_VentilType***	Type of ventilation, unit 2	1

UNIT 3

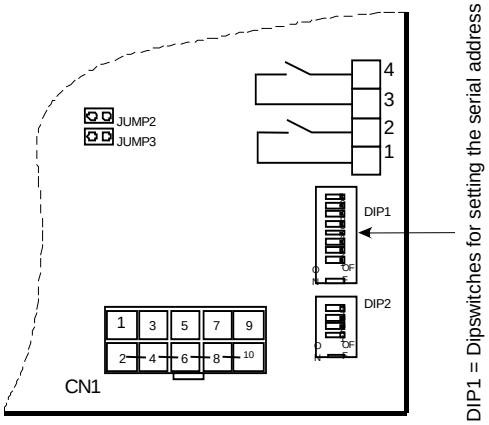
Add	*Code*	*Description*	*Default*
55	***U3_Mcomp1***	Type of compressors, module 1 unit 3	0
56	***U3_RecoverEn1***	Enable recovery, compressor module 1 unit 3	0
57	***U3_Mcomp2***	Type of compressors, module 2 unit 3	0
58	***U3_RecoverEn2***	Enable recovery, compressor module 2 unit 3	0
59	***U3_Mcomp3***	Type of compressors, module 3 unit 3	0
60	***U3_RecoverEn3***	Enable recovery, compressor module 3 unit 3	0
61	***U3_MEvap***	Enable evaporator module, unit 3	0
71	***U3_Weightprobe***	Weight on average Out, unit 3	0
62	***U3_VentilType***	Type of ventilation, unit 3	0

SETTING THE HARDWARE ADDRESS OF THE CENTRAL MODULE



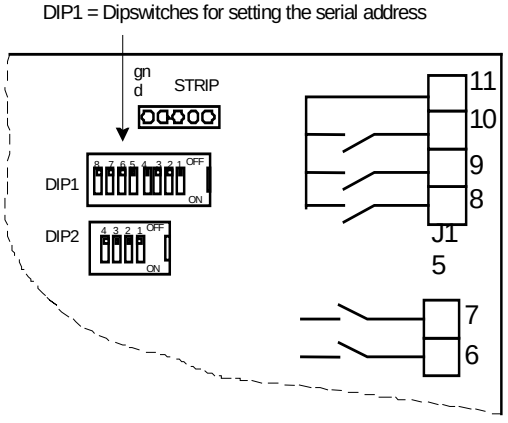
The address of the central module is always = 25

SETTING THE HARDWARE ADDRESS OF THE EVAPORATOR MODULE



The address of the evaporator module is always higher than the address of the compressor modules

SETTING THE HARDWARE ADDRESS OF THE TRIO AND TANDEM MODULES



The address of the compressor module is always lower than the address of the evaporator module

TABLE FOR SETTING THE HARDWARE ADDRESS

Configuration DIP1 - DIP2									
ADDRESS	**SW1**	**SW2**	**SW3**	**SW4**	**SW5**	**SW6**	**SW7**	**SW8**	**Device**
0	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	**NOT ALLOWED**
1	**ON**	OFF	OFF	OFF	OFF	OFF	OFF	OFF	-
2	OFF	**ON**	OFF	OFF	OFF	OFF	OFF	OFF	**-**
3	**ON**	**ON**	OFF	OFF	OFF	OFF	OFF	OFF	**-**
4	OFF	OFF	**ON**	OFF	OFF	OFF	OFF	OFF	**-**
5	**ON**	OFF	**ON**	OFF	OFF	OFF	OFF	OFF	**-**
6	OFF	**ON**	**ON**	OFF	OFF	OFF	OFF	OFF	**-**
7	**ON**	**ON**	**ON**	OFF	OFF	OFF	OFF	OFF	**-**
8	OFF	OFF	OFF	**ON**	OFF	OFF	OFF	OFF	**-**
9	**ON**	OFF	OFF	**ON**	OFF	OFF	OFF	OFF	**-**
10	OFF	**ON**	OFF	**ON**	OFF	OFF	OFF	OFF	**-**
11	**ON**	**ON**	OFF	**ON**	OFF	OFF	OFF	OFF	**-**
12	OFF	OFF	**ON**	**ON**	OFF	OFF	OFF	OFF	**-**
13	**ON**	OFF	**ON**	**ON**	OFF	OFF	OFF	OFF	**-**
14	OFF	**ON**	**ON**	**ON**	OFF	OFF	OFF	OFF	**-**
15	**ON**	**ON**	**ON**	**ON**	OFF	OFF	OFF	OFF	**-**
16	OFF	OFF	OFF	OFF	**ON**	OFF	OFF	OFF	**-**
17	**ON**	OFF	OFF	OFF	**ON**	OFF	OFF	OFF	**-**
18	OFF	**ON**	OFF	OFF	**ON**	OFF	OFF	OFF	**-**
19	**ON**	**ON**	OFF	OFF	**ON**	OFF	OFF	OFF	**-**
20	OFF	OFF	**ON**	OFF	**ON**	OFF	OFF	OFF	**-**
21	**ON**	OFF	**ON**	OFF	**ON**	OFF	OFF	OFF	**-**
22	OFF	**ON**	**ON**	OFF	**ON**	OFF	OFF	OFF	**-**
23	**ON**	**ON**	**ON**	OFF	**ON**	OFF	OFF	OFF	**-**
24	OFF	OFF	OFF	**ON**	**ON**	OFF	OFF	OFF	**-**
25	**ON**	OFF	OFF	**ON**	**ON**	OFF	OFF	OFF	**CENTRAL MODULE**

NOTE
The hardware address of the modules that make up the system must be set before any other configuration operation.

LOCAL INTERFACE ADDRESS

By definition, it has been established that the LOCAL KEYPAD is recognised by the local network layout as the module with address = **26**. To initialise the local interface, use the screens as highlighted below:

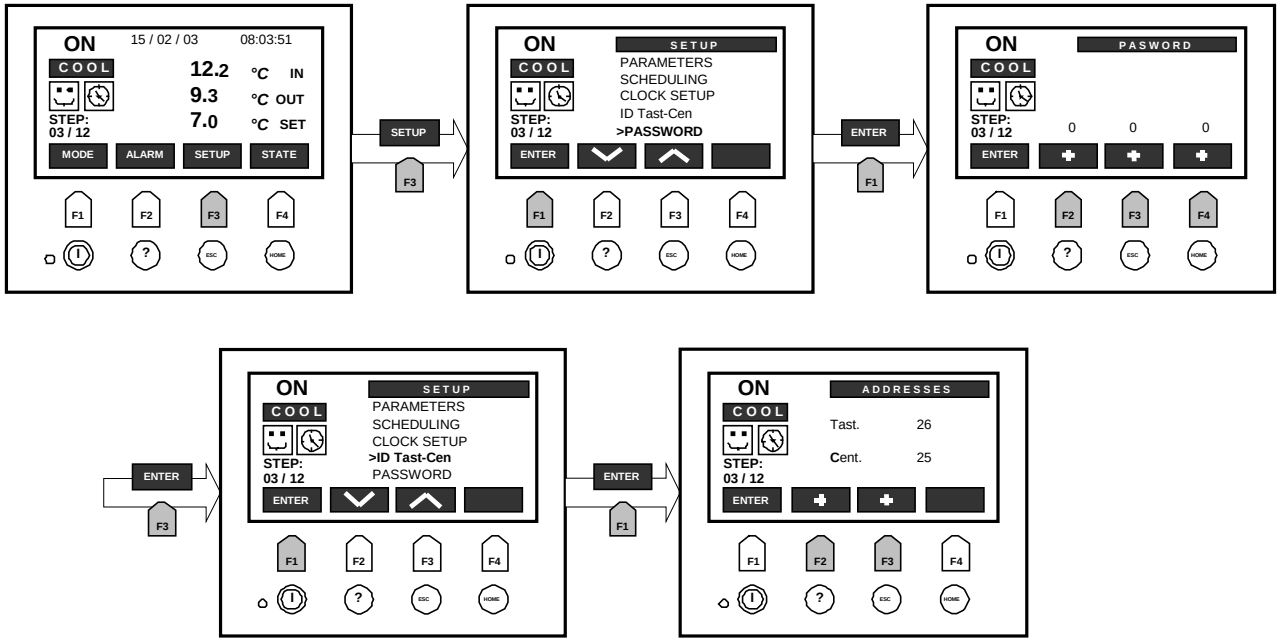


Figure 2

NOTE

Figure 2 shows how the address of the local keypad requires a password (known by the Clivet service centres).

REMOTE INTERFACE ADDRESS

By definition, it has been established that the REMOTE KEYPAD is recognised by the local network layout as the module with address = **27**.

Follow the instructions indicated in Figure 2, and then at the end set the address as shown in Figure 3

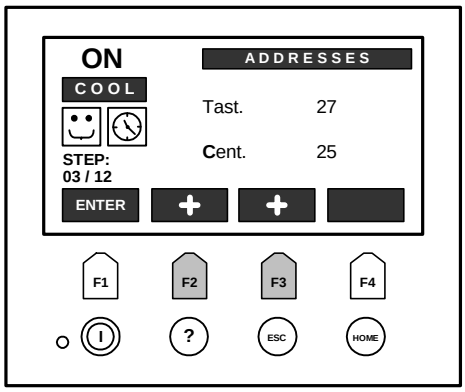


Figure 3

NOTE

Figure 2 shows how the address of the local keypad requires a password (known by the Clivet service centres).

CONFIGURATION EXAMPLE
To better understand the configuration mode of the local network, the following refrigeration unit will be used as an example:

Type of unit = WSAT-SC 65D_R-407C
No. of Central Modules = 1
No. of Evaporator Modules = 0
No. of Tandem Modules = 2

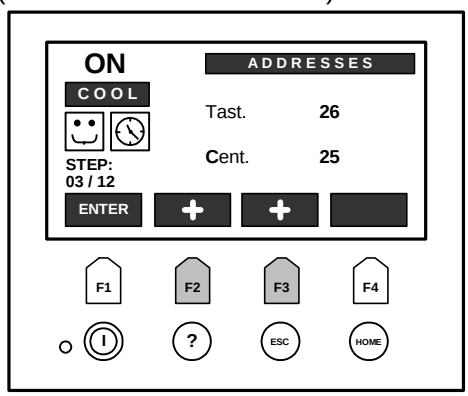
SETTING THE HARDWARE ADDRESS

CENTRAL MODULE. ADDRESS = **25** (See central module address)

TANDEM MODULE 1 ADDRESS = **1** (See trio and tandem module address)

TANDEM MODULE 2 ADDRESS = **2** (See trio and tandem module address)

LOCAL KEYPAD ADDRESS = **26** (See local interface address)



SETTING THE SOFTWARE ADDRESS

To correctly configure the modules in a local network, set the parameters as shown below

UNIT 1

Add	Code	*Description*	*Default*
39	**U1_Mcomp1**	**Type of compressors, module 1 unit 1**	**2**
40	*U1_RecoverEn1*	Enable recovery, compressor module 1 unit 1	0
41	**U1_Mcomp2**	**Type of compressors, module 2 unit 1**	**2**
42	*U1_RecoverEn2*	Enable recovery, compressor module 2 unit 1	0
43	U1_Mcomp3	Type of compressors, module 3 unit 1	0
44	*U1_RecoverEn3*	Enable recovery, compressor module 3 unit 1	0
45	*U1_MEvap*	Enable evaporator module, unit 1	0
69	*U1_Weightprobe*	Weight on average Out, unit 1	100
46	*U1_VentilType*	Type of ventilation, unit 1	1

UNIT 2

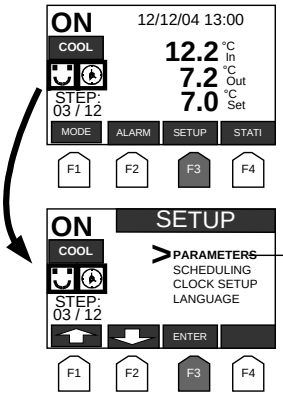
Add	Code	*Description*	*Default*
47	U2_Mcomp1	Type of compressors, module 1 unit 2	0
48	*U2_RecoverEn1*	Enable recovery, compressor module 1 unit 2	0
49	U2_Mcomp2	Type of compressors, module 2 unit 2	0
50	*U2_RecoverEn2*	Enable recovery, compressor module 2 unit 2	0
51	U2_Mcomp3	Type of compressors, module 3 unit 2	0
52	*U2_RecoverEn3*	Enable recovery, compressor module 3 unit 2	0
53	*U2_MEvap*	Enable evaporator module, unit 2	0
70	*U2_Weightprobe*	Weight on average Out, unit 2	0
54	*U2_VentilType*	Type of ventilation, unit 2	0

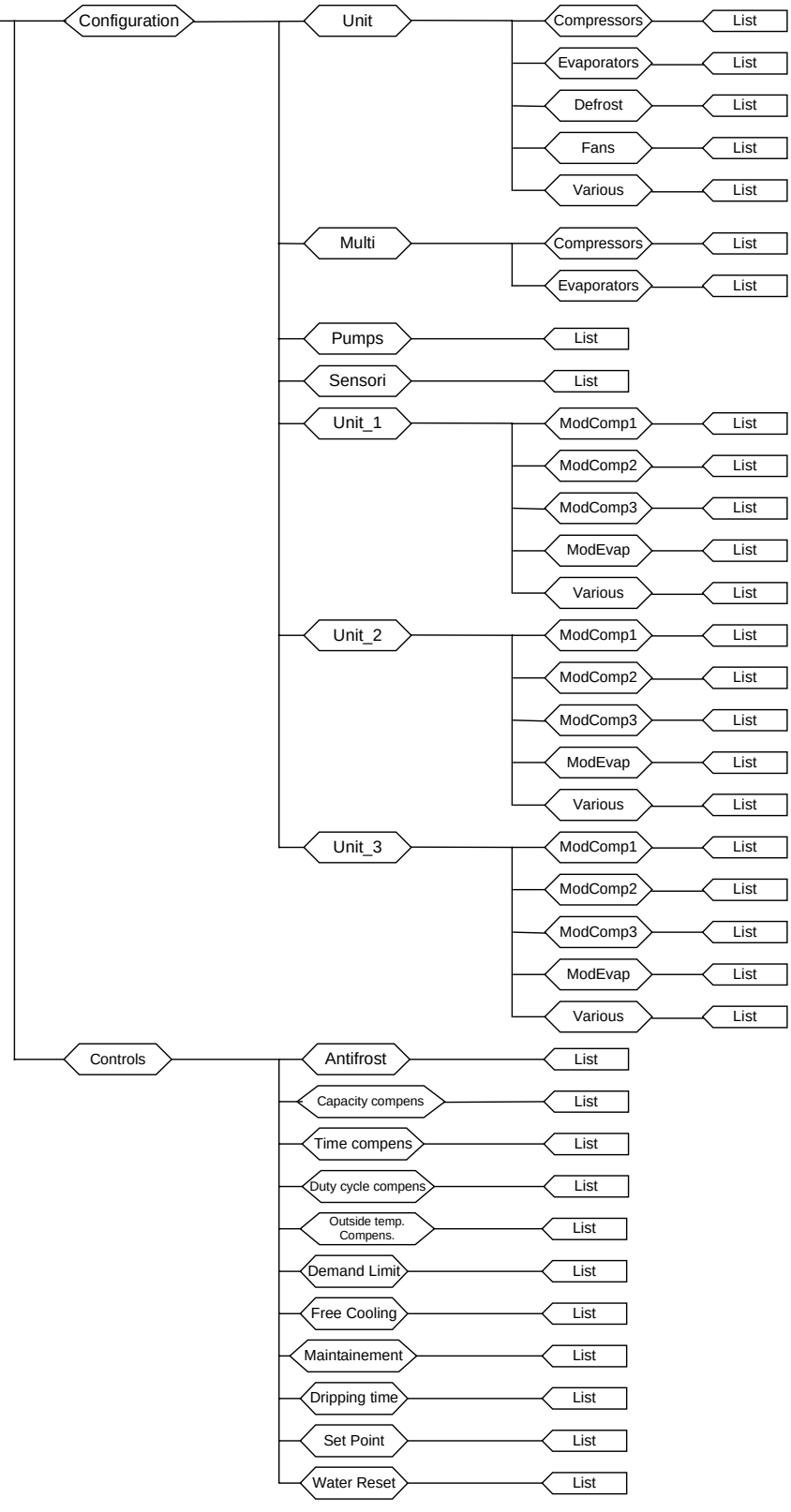
UNIT 3

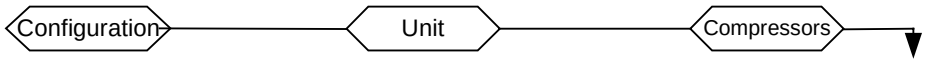
Add	Code	*Description*	*Default*
55	U3_Mcomp1	Type of compressors, module 1 unit 3	0
56	*U3_RecoverEn1*	Enable recovery, compressor module 1 unit 3	0
57	U3_Mcomp2	Type of compressors, module 2 unit 3	0
58	*U3_RecoverEn2*	Enable recovery, compressor module 2 unit 3	0
59	U3_Mcomp3	Type of compressors, module 3 unit 3	0
60	*U3_RecoverEn3*	Enable recovery, compressor module 3 unit 3	0
61	*U3_MEvap*	Enable evaporator module, unit 3	0
71	*U3_Weightprobe*	Weight on average Out, unit 3	0
62	*U3_VentilType*	Type of ventilation, unit 3	0

At this point, the local network is configured correctly to receive the setting of the unit operating parameters.

PARAMETER MENU TREE

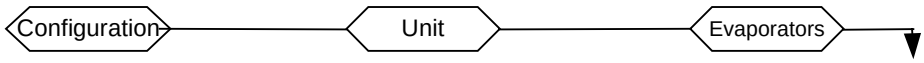




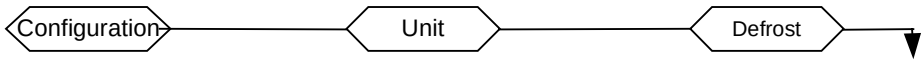


Add	Code	Description	UOM	Pass
131/CMP	hp2enabled	**Enable HP pre-alarm 2** The pre-alarm disconnects power from the circuit so as to avoid shutting down the unit due to the HP alarm, when the threshold set for parameter 193 is exceeded	YES-NO	2
132/CMP	nprehp2hour	**Max number of HP pre-alarm 2** When the number of activations/hour indicated is exceeded, an alarm with manual reset is activated on the circuit	Num	2
133/CMP	hp1enabled	**Enable HP pre-alarm 1** The pre-alarm operates the fan at the maximum (in cooling mode) so as to avoid shutting down the unit due to the HP alarm, when the threshold set for parameter 233 is exceeded	YES-NO	2
134/CMP	lp1enabled	**Enable LP pre-alarm** The pre-alarm disconnects power from the circuit so as to avoid shutting down the unit due to the low pressure alarm, when the threshold set for parameter 195 is exceeded	YES-NO	2
135/CEN	npreLp1hour	**Maximum number LP pre-alarms / hour** When the number of activations/hour indicated is exceeded, an alarm with manual reset is activated on the circuit	Num	1
136/CMP	maxlphour	**Maximum number LP alarms / hour** When the number of activations/hour indicated is exceeded, an alarm with manual reset is activated on the circuit	Num	1
137/CMP	bypmincool	**Low pressure bypass time in cooling** Time, counted from when each compressor in the circuit starts, during which the activation of the pressure switch is ignored.	Sec	1
138/CMP	bypminheat	**Low pressure bypass in heating** Time, counted from when each compressor in the circuit starts, during which the activation of the pressure switch is ignored.	Sec	1
140/CMP	bplpon	**Low pressure alarm bypass in stable operation** Delay time for the minimum pressure switch	Sec	2
167/CMP	weighthour	**Weight of the hours** Contribution of the total number of compressor operating hours in the calculation of the rotations	num	2
168/CMP	weightstart	**Weight of the starts** Contribution of the total number of compressor starts in the calculation of the rotations	num	2
178/CMP	valvemode	**Polarity of the reversing valve** 0= energised in cooling 1= energised in heating		2
188/CMP	pump_down	**Enable pump_down** 0= Not enabled 1= Enabled at compressor start 2= Enabled at compressor stop 3= Enabled at compressor start and stop		1

189/CMP	setprehp2	**High pressure pre-alarm 2 set point** HP pre-alarm 2 activation threshold	Bar	1
190/CMP	diffhp2	**High pressure pre-alarm 2 reset differential**	Bar	1
191/CMP	setprelp1	**Low pressure pre-alarm 1 set point** Low pressure pre-alarm 1 activation threshold	Bar	1
192/CMP	difflp1	**Low pressure pre-alarm 1 reset differential**	Bar	1
193/CMP	deltapmax	Maximum value of the evap / condenser pressure difference. Threshold for the pressure difference between the gas intake and discharge that stops the circuit, after the time indicated for parameter 199	Bar	2
194/CMP	scandeltap	**Scan time for pressure difference** The system checks at preset intervals (the interval being set by this parameter) the differential between the gas intake and discharge pressure.	Sec	1
195/CMP	tmaxdeltap	**Maximum time at P diff. > Max P diff.** Time that the circuit remains at the maximum pressure differential between intake and discharge before stopping	Sec	1
196/CMP	bptcstart	**Compressor overload bypass from power up** Time in which the compressor overload alarm is ignored from power up (during this time the compressor cannot be activated in any case)	Sec	1
197/CMP	timeon-on	**Minimum time between 2 starts of the same compressor** Minimum time that must elapse between successive starts of the same compressor.	Sec	1
198/CMP	timeoff-on	**Minimum time between compressor stop and start** Minimum time that must elapse from when a compressor stops to when it starts again.	Sec	1
199/CMP	tstarting	**Minimum time between starts of different compressors**	Sec	1
200/CMP	trelease	**Minimum time between stops of different compressors**	Sec	1
229/CMP	smaxprec	**HP pre-alarm 1 activation threshold** HP pre-alarm 1 activation threshold (maximum ventilation)	Bar	1
230/CMP	diffmaxprec	**HP pre-alarm 1 reset differential**	Bar	1

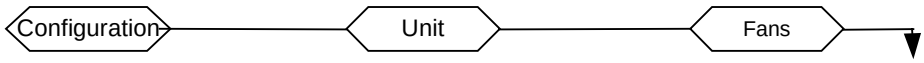


Add	Code	Description	UOM	Pass
37/EVA	***SetResist***	**Antifreeze heater set point** Activation threshold for the antifreeze heaters	°C	0
39/EVA	**ALLFreeze**	**Antifreeze alarm set point** Activation threshold for the alarm antifreeze	°C	0
41/EVA	**PreAF**	**Antifreeze pre-alarm set point** Antifreeze pre-alarm activation threshold	°C	0
231/EVA	**IsPreAF**	**Antifreeze pre-alarm reset hysteresis**	°C	1
233/EVA	**IstAllFreeze**	Hysteresis for resetting the antifreeze alarm	°C	1
235/EVA	**RitComp**	**Delay compressors from start pump** Minimum time between the activation of the water pump and the possible activation of the compressors	Sec	1
237/EVA	**BypassFlusso**	**Flow alarm bypass from start pump** Time counted from the start of the water pump, during which the no water flow alarm is ignored.	Sec	1
239/EVA	**RitPompaOff**	**Delay stop pump from unit OFF** Time that must elapse between when the unit is switched OFF and the pump stops.	Sec	1
241/EVA	**TimeStartPump**	**Pump ON time** Determines the minimum operating time of the circulating pump, when this is activated by the MAINTENANCE function.	Sec	1
243/EVA	**TscanMant**	**Maintenance scan time** Sets the interval between two starts of the circulating pump in MAINTENANCE operation	Sec	1
245/EVA	**MinFreeze**	**Minimum value of the antifreeze set point** Minimum limit for setting the activation threshold for the antifreeze alarm and the antifreeze heaters.	°C	1
248/EVA	**MaxFreeze**	**Maximum value of the antifreeze set point** Maximum limit for setting the activation threshold for the antifreeze alarm and the antifreeze heaters	°C	1
251/EVA	**BypassFreeze**	**Antifreeze alarm bypass time** Time counted from the start of the unit in heating mode, during which the antifreeze alarm is ignored.	Sec	1

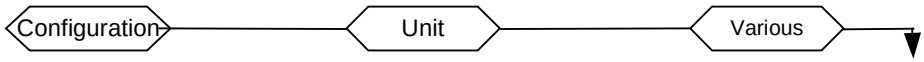


Add	***Code***	Description	UOM	Pass
139/CMP	**bplpdrf**	**Low pressure bypass time in defrost** Time counted from when 4-way valve switches for defrosting, during which the low pressure alarm is ignored.	Sec	1
201/CMP	**pstartdfr**	**Start defrost count pressure threshold** From when the evaporation pressure falls and remains below this threshold, the defrost delay timer starts counting down (only when the compressors are on).	Bar	1
202/CMP	**tstartdfr**	**Start defrost temperature threshold** Threshold for the coil temperature that determines the immediate switching of the 4-way valve for defrosting, if the defrost delay time has already expired.	°C	1
203/CMP	**tstopdfr**	**End defrost temperature** Threshold for the coil temperature above which the defrost ends.	°C	1
204/CMP	**tmaxdfr**	**Maximum defrost time** Maximum duration of the defrost phase. After this time the defrost will always end.	Sec	1
205/CMP	**timeindfr**	**Maximum defrost delay** Maximum time limit setting for parameter 215.	Sec	1
206/CMP	**ttransient**	**Transient time in defrost** Time required by the compressor to reach stable operating conditions.	Sec	2
207/CMP	**deltapdfr**	**Pressure hysteresis to stop count** Evaporation pressure offset relating to the value set for parameter 205, over which the defrost timer is reset.	Bar	1
208/CMP	**maxcnt**	**Maximum count increase** The defrost timer will count down by a variable value according to the rate of change of the evaporation pressure. This parameter sets the maximum count down increase value that cannot be exceeded.	num	1
209/CMP	**rateomaxp**	**Maximum pressure change rate** Maximum variation envisaged for the evaporation pressure over one minute.	num	2
210/CMP	**tmincntdfr**	**Minimum defrost delay time** Minimum time limit for the calculations performed by the system when determining the delay between the activation of the timer and the actual defrost.	Sec	1

211/CMP	**tmaxcntdfr**	**Maximum defrost delay count time** Time limit that cannot be exceeded in the calculations performed by the system when determining the delay between the activation of the timer and the actual defrost.	Sec	1
212/CMP	**textmindly**	**Outside temperature for minimum defrost delay** Temperature of the outside air at which the defrost delay is set to the minimum (equal to the value of parameter 214) This value must be greater than the value set for parameter 217	°C	1
213/CMP	**textmaxdly**	**Outside temperature for maximum defrost delay** Temperature of the outside air at which the defrost delay is set to the maximum (equal to the value of parameter 215). This value must be lower than the value set for parameter 216	°C	1
214/CMP	**timedrain**	**Coil dripping time** Time the compressors stop for after the defrost, to allow the water to drip from the coils.	Sec	1
215/CMP	**textdfr**	**Outside temperature threshold for fan activation** Outside air temperature above which the fans are started, during the dripping phase, so as to assist the process.	°C	1
216/CMP	**timefandfr**	**Fan activation time** Duration of fan operation after the defrost	Sec	1
217/CMP	**pdfr**	**Force defrost pressure** Once having reached this evaporation pressure threshold, the defrost is forced to start (if the count is as active for at least the value set for parameter 222)	Bar	1
218/CMP	**tfdfr**	**Minimum force defrost count time** Minimum time after which the defrost can be forced on due to minimum pressure.	°C	1



Add	***Code***	Description	UOM	Pass
172/CMP	**tstartup**	**Fan start time** Duration of the fan start-up phase.	Sec	1
173/CMP	**tbycutoff**	**Minimum operating time from compressor start** Time that the fans are operated for even without the required pressure conditions.	Sec	1
174/CMP	**maxfan**	**Maximum fan speed** Maximum value allowed for the fan control signal.	%	1
175/CMP	**minfan**	**Minimum fan speed** Minimum value allowed for the fan control signal	%	1
176/CMP	**maxstartup**	**Fan speed at start** Speed of the fan during the start-up time	%	1
177/CMP	**typece**	**Type of condenser** Air- or water-cooled condenser		2
219/CMP	**fanpfcorr**	no meaning		2
220/CMP	**onfancool**	**Pressure threshold for switching fans on with compressor off** This function allows the fans to be operated even when the compressors are off, if the pressure exceeds, due to a high outside temperature, the set threshold	Bar	1
221/CMP	**onfanheat**	**Pressure threshold for switching fans on with compressor off** Not active	Bar	1
222/CMP	**maxfanheat**	**Pressure threshold for maximum fan speed in heating** Pressure value corresponding to the point of maximum fan speed. (At higher pressure values the speed decreases) The value entered must be lower than the value set for par. 227.	Bar	1
223/CMP	**minfanheat**	**Pressure threshold for minimum fan speed in heating** Pressure value corresponding to the point of minimum fan speed. (At lower pressure values the speed increases). The value must be higher than the value set for par. 226	Bar	1
224/CMP	**maxfancool**	**Pressure threshold for maximum fan speed in cooling** Pressure value corresponding to the point of maximum fan speed. (At lower pressure values the speed decreases) The value must be higher than the value set for par. 229.	Bar	1
225/CMP	**minfancool**	**Pressure threshold for minimum fan speed in cooling** Pressure value corresponding to the point of minimum fan speed. (At higher pressure values the speed increases). The value must be lower than the value set for par. 228	Bar	1
226/CMP	**cutoffheat**	**Pressure threshold to stop fans in heating** Pressure threshold at which the fans (already at minimum speed) are stopped. The value must be higher than the value set for par. 227	Bar	1
227/CMP	**cutoffcool**	**Pressure threshold to stop fans in cooling** Pressure threshold at which the fans (already at minimum speed) are stopped. The value must be lower than the value set for par. 229	Bar	1
228/CMP	**timeoffv**	**Condenser water flow alarm bypass time** Corresponds to the opening time of the water valve. Active if parameter 181 is set to 1.	Sec	1



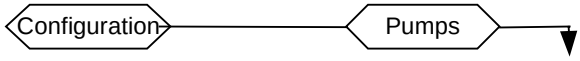
Add	***Code***	Description	UOM	Pass
8/CEN	***EnReversCycle***	**Enable heat pump** Enable the unit for reverse-cycle operation		2
12/CEN	**RemoteMode**	**Enable remote mode** Enable the remote control from digital inputs or from the supervisor system via the serial protocol.		1
38/CEN	**KPUMP**	**Enable pump control for rotation** With KPUMP=1, the system, when choosing the next step to be activated or deactivated, will consider which circuit pumps are already on, giving these the priority.		2
67/CEN	**ParOffremEN**	**Enable remote ON-OFF** Enable the remote control from digital inputs or from the supervisor system via the serial protocol.		1
84/CEN	**INRecupEn**	**Enable recovery** Enable the recovery activation digital input.		
85/CEN	**TinEn**	**Configure the use of the central module inlet temperature probe** The inlet temperature probe on the central module can be configured as “no probe”, display-only or alternatively as a probe that is used in the temperature control actions.		2
99/CEN	**Tstarting**	**Minimum time between the activation of different steps** Minimum time between the activation of two different capacity-control steps by the temperature controller	Sec	1
100/CEN	**Trelease**	**Minimum time between the deactivation of different steps** Minimum time between the deactivation of two different capacity-control steps by the temperature controller	Sec	1
127/CEN	**TimeStartPump**	**Minimum pump start time in maintenance**		
130/CEN	**TrunningCP**	**Time for compressors to reach stable operation** Estimate of the time required for a compressor to reach stable operation, from starting.	Sec	1

Add	***Code***	Description	UOM	Pass
141/CMP	***rotenabled***	**Enable rotation in the circuit*** Used to define whether the compressors in the same “compressor module” can be rotated or not.		2
142/CMP	***numerocp***	**Number of compressors*** Defines the number of compressors in the same “compressor module”	num	2
143/CMP	***fattoreorecircuito***	**Weight of total hours for rotation*** Defines the weight of the total operating hours of the individual compressor in selecting which compressor to activate or deactivate, within the individual “compressor module”.	num	2
144/CMP	***fattorespunticircuit***	**Weight of total starts for rotation** Defines the weight of the total starts of the individual compressor in selecting which compressor to activate or deactivate, within the individual “compressor module”.	num	2
146/CMP	***Potc1***	**Capacity compressor 1***	num	1
147/CMP	***Potc2***	**Capacity compressor 2***	num	1
148/CMP	***Potc3***	**Capacity compressor 3***	num	1
164/CMP	***comptype0***	**Type of compressor 1***		1
165/CMP	***comptype1***	**Type of compressor 2***		1
166/CMP	***comptype2***	**Type of compressor 3***		1
179/CMP	***AI1enable***	**Enable condensing temperature probe*** Defines the presence or absence of the probe		1
180/CMP	***AI2enable***	**Enable recovery temperature probe*** Defines the presence or absence of the probe	°C	1
181/CMP	***AI3enable***	**Enable condensing pressure transducer*** Defines the presence or absence of the transducer	°C	1
182/CMP	***AI4enable***	**Enable evaporation pressure transducer*** Defines the presence or absence of the transducer	Bar	1
183/CMP	***offsetprobe0***	**Condensing temperature correction offset*** Used to correct any reading errors	Bar	1
184/CMP	***offsetprobe1***	**Recovery temperature correction offset*** Used to correct any reading errors		2
185/CMP	***offsetprobe2***	**Condensing pressure correction offset*** Used to correct any reading errors	num	1
186/CMP	***offsetprobe3***	**Evaporation pressure correction offset*** Used to correct any reading errors	num	1
187/CMP	***Presenzarecupero***	**Enable recovery in the circuit*** Defines whether the circuit represented by the compressor module includes a heat recovery exchanger and whether this is used.	num	1
232/CMP	***ore_compon1***	**Total hours compressor 1***	num	1
234/CMP	***ore_compon2***	**Total hours compressor 2***	num	1
236/CMP	***ore_compon3***	**Total hours compressor 3***	num	1
238/CMP	***Spunti1***	**Total starts compressor 1***	num	1
240/CMP	***Spunti2***	**Total starts compressor 2***		
242/CMP	***Spunti3***	**Total starts compressor 3***		
244/CMP	***OreCircuito***	**Total hours in the circuit***		
267/CMP	***DeltaPreHPR***	**Differential to reset recovery pre-alarm***		
268/CMP	***NPreHPRHour***	**Max number recovery HP pre-alarms per hour***		
269/CMP	***SetPreHPR***	**Recovery high pressure pre-alarm set point***		
270/CMP	***RitardoPreHPR***	**Delay to reset the recovery pre-alarm condition***		
271/CMP	***BPFlussoStart***	**Recovery flow bypass***		

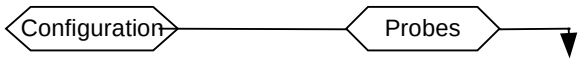
NOTE: The parameters marked with the * are displayed (and must be set) for each of the compressor modules present on the unit.

Add	***Code***	Description	UOM	Pass
246/EVA	***OrePompa1***	**Total hours pump 1***	num	1
247/EVA	***NPump***	**Number of pumps present*** Defines the number of pumps present on the single evaporator module	num	2
249/EVA	***OrePompa2***	**Total hours pump 2***	num	1
250/EVA	***DoubleprobeEn***	**Enable double water outlet probe*** Defines the number of water outlet temperature probes present on the single evaporator module.		2
252/EVA	***IstResist***	**Antifreeze heater deactivation hysteresis*** Refers to components located on the evaporator modules	°C	1
253/EVA	***SecondPumpEn***	**Enable second pump*** Refers to components located on the evaporator modules		2
254/EVA	***OffsetTin***	**Water inlet probe correction offset*** Refers to components located on the evaporator modules	°C	1
255/EVA	***MainPumpEn***	**Enable pump as main system pump*** Refers to components located on the evaporator modules		2
256/EVA	***OffsetTout1***	**Water outlet probe 1 correction offset*** Refers to components located on the evaporator modules	°C	1
257/EVA	***ResistEn***	**Enable antifreeze heaters*** Refers to components located on the evaporator modules		2
258/EVA	***OffsetTout2***	**Water outlet probe 2 correction offset*** Refers to components located on the evaporator modules	°C	1
259/EVA	***IngConf***	**Configure the type of analogue input*** Refers to components located on the evaporator modules		2
260/EVA	***ProbInEvap***	**Enable water inlet probe*** Refers to components located on the evaporator modules		2

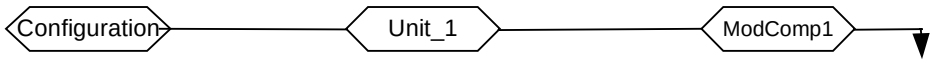
NOTE: The parameters marked with the * are displayed (and must be set) for each of the compressor modules present on the unit.



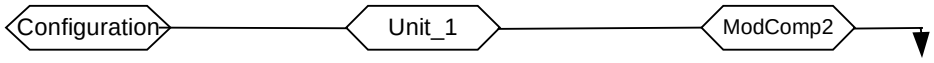
Add	*Code*	Description	UOM	Pass
68/CEN	***MainPumpEn***	**Enable main pump on central** Refers to components connected to the central module		1
69/CEN	***NPumps***	**Number of pumps on central** Refers to components connected to the central module	num	1
122/CEN	***OrePompa1***	**Total hours pump 1 central** Refers to components connected to the central module	num	1
123/CEN	***OrePompa2***	**Total hours pump 2 central** Refers to components connected to the central module	num	1
124/CEN	***RitCompressori***	**Time delay between start pumps and start compressors** Refers to components connected to the central module	Sec	1
125/CEN	***ByPassFlusso***	**Flow alarm time bypass from start pump** Refers to components connected to the central module	Sec	1
126/CEN	***RitPompaOFF***	**Stop pump delay from unit OFF** Refers to components connected to the central module	Sec	1



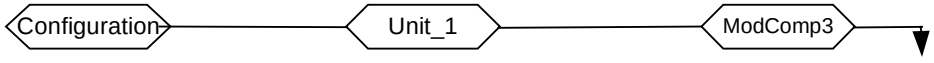
Add	*Code*	Description	UOM	Pass
9/CEN	***ProbeText***	**Enable outside temperature probe**		1
23/CEN	***ProbeURExt***	**Enable outside RH% probe**		1
65/CEN	***ProbeInEN***	**Enable water inlet probe on central**		2
66/CEN	***ProbeOutEN***	**Enable water outlet probe on central**		2
70/CEN	***ToutEn***	**Configure the use of the central module outlet temperature probe** The probe may be display only, or a control probe		2
76/CEN	***OffsetText***	**Outside temperature probe correction offset**	°C	1
77/CEN	***OffsetTout***	**Water outlet temperature probe correction offset**	°C	1
78/CEN	***OffsetTin***	**Water inlet temperature probe correction offset**	°C	1
79/CEN	***OffsetWR***	**Water reset signal correction offset**		1
80/CEN	***OffsetDL***	**Demand Limit signal correction offset**		1
81/CEN	***OffsetURExt***	**Outside RH% probe correction offset**	%	1
82/CEN	***TypeDL***	**Configure type of Demand Limit signal**		1
83/CEN	***TypeWR***	**Configure type of Water reset signal**		1



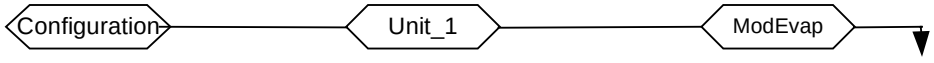
Add	*Code*	*Description*	*UOM*	*Pass*
40/CEN	***U1_Mcomp1***	**Type of compressors, module 1 unit 1**		2
42/CEN	***U1_RecoverEn1***	**Enable recovery, compressor module 1 unit 1**		2



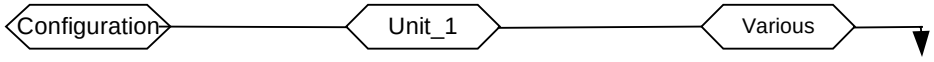
Add	*Code*	*Description*	*UOM*	*Pass*
43/CEN	***U1_Mcomp2***	**Type of compressors, module 2 unit 1**		2
44/CEN	***U1_RecoverEn2***	**Enable recovery, compressor module 2 unit 1**		2



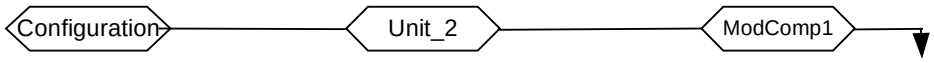
Add	*Code*	*Description*	*UOM*	*Pass*
45/CEN	***U1_Mcomp3***	**Type of compressors, module 3 unit 1**		2
46/CEN	***U1_RecoverEn3***	**Enable recovery, compressor module 3 unit 1**		2



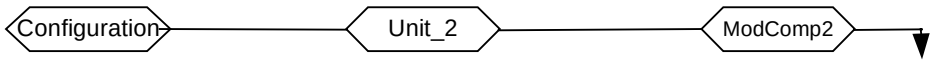
Add	*Code*	*Description*	*UOM*	*Pass*
47/CEN	***U1_MEvap***	***Enable evaporator module 1*** Used to define the presence or absence of the module		2
71/CEN	***U1_Weightprobe***	***Weight on average Out*** Used to define the influence, as a percentage, of the evaporator water outlet temperature, in the calculation of the average unit outlet temperature, if the water flow-rates in the various evaporators are not equal.	%	2



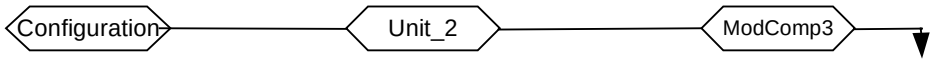
Add	*Code*	*Description*	*UOM*	*Pass*
48/CEN	***U1_VentilType***	***Type of ventilation, unit 1*** Ventilation independent from the ventilation of the other compressor modules, or in common. (The fans operate at the highest speed corresponding to the various compressor modules connected)		2



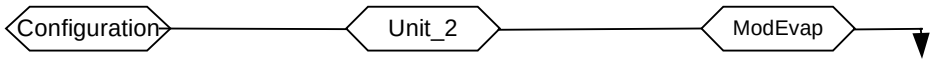
Add	Code	Description	UOM	Pass
49/CEN	***U2_Mcomp1***	**Type of compressors, module 1 unit 2**		2
50/CEN	***U2_RecoverEn1***	**Enable recovery, compressor module 1 unit 2**		2



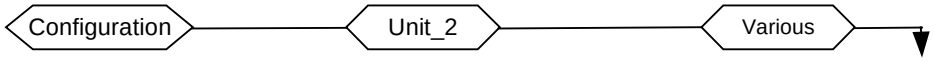
Add	Code	Description	UOM	Pass
51/CEN	***U2_Mcomp2***	**Type of compressors, module 2 unit 2**		2
52/CEN	***U2_RecoverEn2***	**Enable recovery, compressor module 2 unit 2**		2



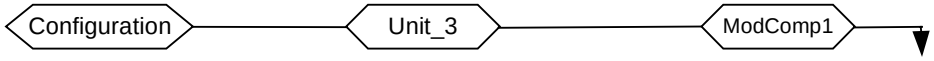
Add	Code	Description	UOM	Pass
53/CEN	***U2_Mcomp3***	**Type of compressors, module 3 unit 2**		2
54/CEN	***U2_RecoverEn3***	**Enable recovery, compressor module 3 unit 2**		2



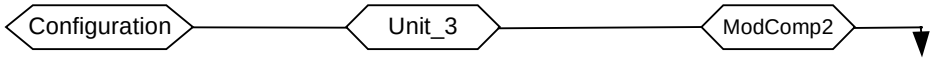
Add	Code	Description	UOM	Pass
55/CEN	***U2_MEvap***	***Enable evaporator module 2*** Used to define the presence or absence of the module		2
72/CEN	***U2_Weightprobe***	***Weight on average Out*** Used to define the influence, as a percentage, of the evaporator water outlet temperature, in the calculation of the average unit outlet temperature, if the water flow-rates in the various evaporators are not equal.	%	2



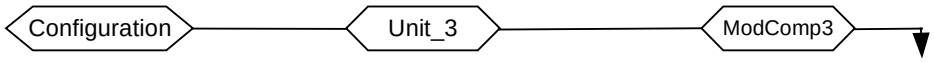
Add	Code	Description	UOM	Pass
56/CEN	***U2_VentilType***	***Type of ventilation, unit 2*** Ventilation independent from the ventilation of the other compressor modules, or in common. (The fans operate at the highest speed corresponding to the various compressor modules connected)		2



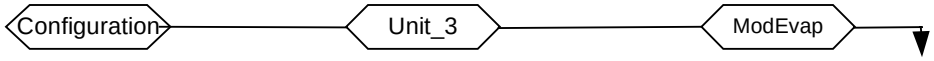
Add	Code	Description	UOM	Pass
57/CEN	***U3_Mcomp1***	**Type of compressors, module 1 unit 3**		2
58/CEN	***U3_RecoverEn1***	**Enable recovery, compressor module 1 unit 3**		2



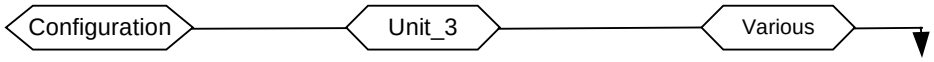
Add	Code	Description	UOM	Pass
59/CEN	***U3_Mcomp2***	**Type of compressors, module 2 unit 3**		2
60/CEN	***U3_RecoverEn2***	**Enable recovery, compressor module 2 unit 3**		2



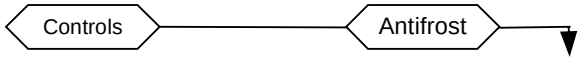
Add	Code	Description	UOM	Pass
61/CEN	***U3_Mcomp3***	Type of compressors, module 3 unit 3		2
62/CEN	***U3_RecoverEn3***	Enable recovery, compressor module 3 unit 3		2



Add	Code	Description	UOM	Pass
63/CEN	***U3_MEvap***	***Enable evaporator module 3*** Used to define the presence or absence of the module		2
73/CEN	***U3_Weightprobe***	***Weight on average Out*** Used to define the influence, as a percentage, of the evaporator water outlet temperature, in the calculation of the average unit outlet temperature, if the water flow-rates in the various evaporators are not equal.	%	2

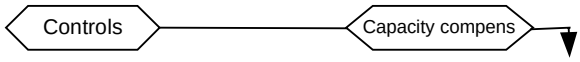


Add	Code	Description	UOM	Pass
64/CEN	***U3_VentilType***	***Type of ventilation, unit 3*** Ventilation independent from the ventilation of the other compressor modules, or in common. (The fans operate at the highest speed corresponding to the various compressor modules connected)		2

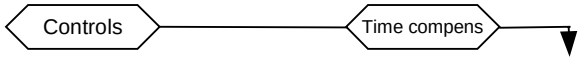


CENTRAL MODULE ANTIFREEZE MANAGEMENT PARAMETERS

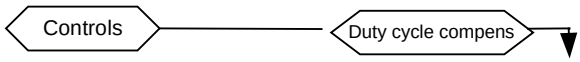
Add	*Code*	*Description*	*UOM*	*Pass*
21/CEN	***IsPreAF***	***Antifreeze pre-alarm hysteresis***	°C	1
22/CEN	***IstAllFreeze***	***Antifreeze alarm hysteresis***	°C	1
92/CEN	***ByPassFreeze***	***Antifreeze alarm bypass time*** Antifreeze alarm bypass time from the activation in heat pump mode. With the unit in standby and an alarm active, heating operation can be activated by bypassing the alarm for the time indicated.	Sec	1
98/CEN	***ScanPreAF***	***Antifreeze pre-alarm scan time***	Sec	1
112/CEN	***MinFreeze***	***Minimum antifreeze value***	°C	1
113/CEN	***MaxFreeze***	**Maximum antifreeze value**	°C	1
115/CEN	***AllFreeze***	**Antifreeze alarm set point**	°C	0
121/CEN	***PreAF***	**Antifreeze pre-alarm set point**	°C	0
261/CEN	***SetResist***	**Antifreeze heater set point**	°C	
262/CEN	***IstResist***	**Antifreeze heater hysteresis**	°C	
264/CEN	***ResistEn***	**Enable antifreeze heaters**	Num	



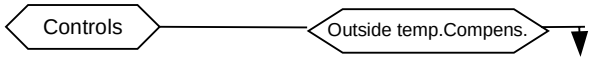
Add	*Code*	*Description*	*UOM*	*Pass*
0/CEN	***ENCCar***	***Enable load compensation***		1
2/CEN	***CompCarH***	***Maximum load compensation value in heating*** Limit of the temperature offset added to the “Current Step Difference” in minimum load conditions.	°C	1
3/CEN	***CompCarC***	***Maximum load compensation value in cooling*** Limit of the temperature offset added to the “Current Step Difference” in minimum load conditions.	°C	1
10/CEN	***MinDeltaC***	***Minimum T diff. in cooling*** Temperature difference between water inlet and outlet, corresponding to maximum compensation	°C	1
28/CEN	***MaxDeltaH***	***Maximum T diff. in heating*** Temperature difference between the water inlet and outlet, corresponding to minimum compensation	°C	1
29/CEN	***MinDeltaH***	***Minimum T diff. in heating*** Temperature difference between water inlet and outlet, corresponding to maximum compensation	°C	1
30/CEN	***MaxDeltaC***	***Maximum T diff. in cooling*** Temperature difference between water inlet and outlet, corresponding to maximum compensation	°C	1
101/CEN	***MediaDelta***	***Time base for the average on the T diff.*** The system calculates the average of the T diff. between the water inlet and outlet based on the samples measured in the time indicated.	Sec	1



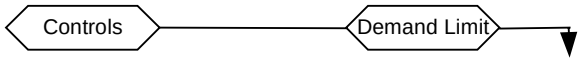
Add	*Code*	*Description*	*UOM*	*Pass*
16	CompONEN	***Enable running time compensation*** Enables the compensation function on the compressor running time		1
99	TimeOnMax	***Upper running time compensation time*** Compressor operating time considered sufficient.	Sec	1
100	TimeOnMin	***Lower running time compensation time*** Compressor operating time considered too short.	Sec	1
133	MaxCON	***Maximum running time compensation value*** Maximum offset to add to the “current step difference”. NB: The value entered will be added three consecutive times if the running time remains below the value set for parameter 100; entering the value 1.5, for example, will bring about a maximum compensation of 4.5°C	°C	1



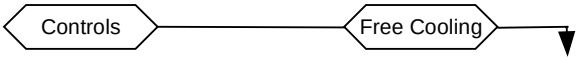
Add	*Code*	*Description*	*UOM*	*Pass*
13/CEN	***MaxCompDuty***	***Maximum duty cycle compensation value*** Maximum value that can be added to the “current step difference” in conditions of maximum compensation	°C	1
14/CEN	***CompDutyEn***	***Enable duty cycle compensation*** Used to enable or disable the function		1
16/CEN	***DutyVar***	***Critical value of the duty cycle***	num	1
97/CEN	***TimeCycle***	***Time base for calculating the duty cycle***	Sec	1



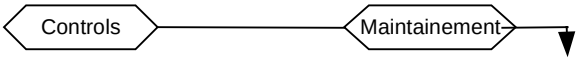
Add	Code	Description	UOM	Pass
1/CEN	***EnCompExt***	***Enable external compensation*** Used to enable or disable the function		1
4/CEN	***MaxCExtC***	***Maximum external compensation value in cooling*** Maximum value than can be added to the “Current Set point” in conditions of minimum outside temperature	°C	1
5/CEN	***MaxCExtH***	***Maximum external compensation value in heating*** “Current Set point” Maximum correction value in conditions of maximum outside temperature	°C	1
93/CEN	***CextMaxH***	***Outside temperature for maximum compensation in heating*** Outside temperature (value higher than the value set for parameter 98) that determines the maximum set point compensation.	°C	1
94/CEN	***CextMinH***	***Outside temperature for minimum compensation in heating*** Outside temperature at which the unit works with the maximum set point.	°C	1
106/CEN	***CextMaxC***	***Outside temperature for maximum compensation in cooling*** Outside temperature (value less than the value set for parameter 111) that determines the maximum set point compensation.	°C	1
107/CEN	***CextMinC***	***Outside temperature for minimum compensation in cooling*** Outside temperature at which the unit works with the minimum set point.	°C	1
110/CEN	***HexMinC***	***Outside enthalpy for minimum compensation*** Outside enthalpy (higher than the value set for parameter 115) that determines the minimum set point.	h	1
111/CEN	***HexMaxC***	***Outside enthalpy for maximum compensation*** Outside enthalpy (less than the value set for parameter 114) that determines the maximum set point (maximum compensation)	h	1



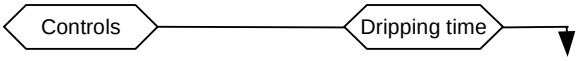
Add	Code	Description	UOM	Pass
7/CEN	***DemandLimitEn***	***Enable Demand Limit*** Enable or disable the function		1
128/CEN	***Treaction***	***Demand limit reaction time*** Filter used to account for excessively fast variations of the input signal	Sec	1



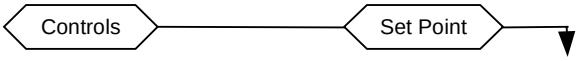
Add	*Code*	*Description*	*UOM*	*Pass*
31/CEN	***DeltaFC***	Temperature difference to start freecooling	°C	1
32/CEN	***IstStopFC***	Temperature hysteresis to end freecooling	°C	1
33/CEN	***IsValveFC***	Temperature hysteresis to close prop. freecooling valve	°C	1
34/CEN	***DeltaMaxFC***	Max fan speed threshold in freecooling	°C	1
35/CEN	***DeltaMinFC***	Min fan speed threshold in freecooling	°C	1
36/CEN	***FCEnable***	Enable freecooling		2
74/CEN	***VelMinFan***	Minimum external ventilation signal value in freecooling	%	1



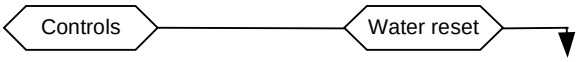
Add	*Code*	*Description*	*UOM*	*Pass*
25/CEN	***MantCoolEn***	Enable Maintenance in Cool	Sec	1
26/CEN	***MantHeatEn***	Enable Maintenance in Heat	°C	1
27/CEN	***NCompMant***	No. compressors in Maintenance	°C	1
103/CEN	***TScanMant***	Maintenance scan time	num	1
114/CEN	***SetMantCool***	Maintenance set point in Cool	Sec	1
117/CEN	***SetMantHeat***	Maintenance set point in Heat	°C	0



Add	*Code*	*Description*	*UOM*	*Pass*
17/CEN	***DeltaTC***	Design temperature difference in cooling	°C	1
18/CEN	***DeltaTH***	Design temperature difference in heating	°C	1
19/CEN	***IsLastStep***	Hysteresis to stop last active step	°C	1
20/CEN	***IsFirstStep***	Hysteresis to start first step	°C	1
109/CEN	***TScanMax***	Maximum step activation scan time	Sec	2
116/CEN	***TScanMin***	Minimum step activation scan time	Sec	2
120/CEN	***TSRelease***	Step deactivation scan time	Sec	2
274/CEN	***TScanRecovery***	Recovery activation scan time	Sec	2

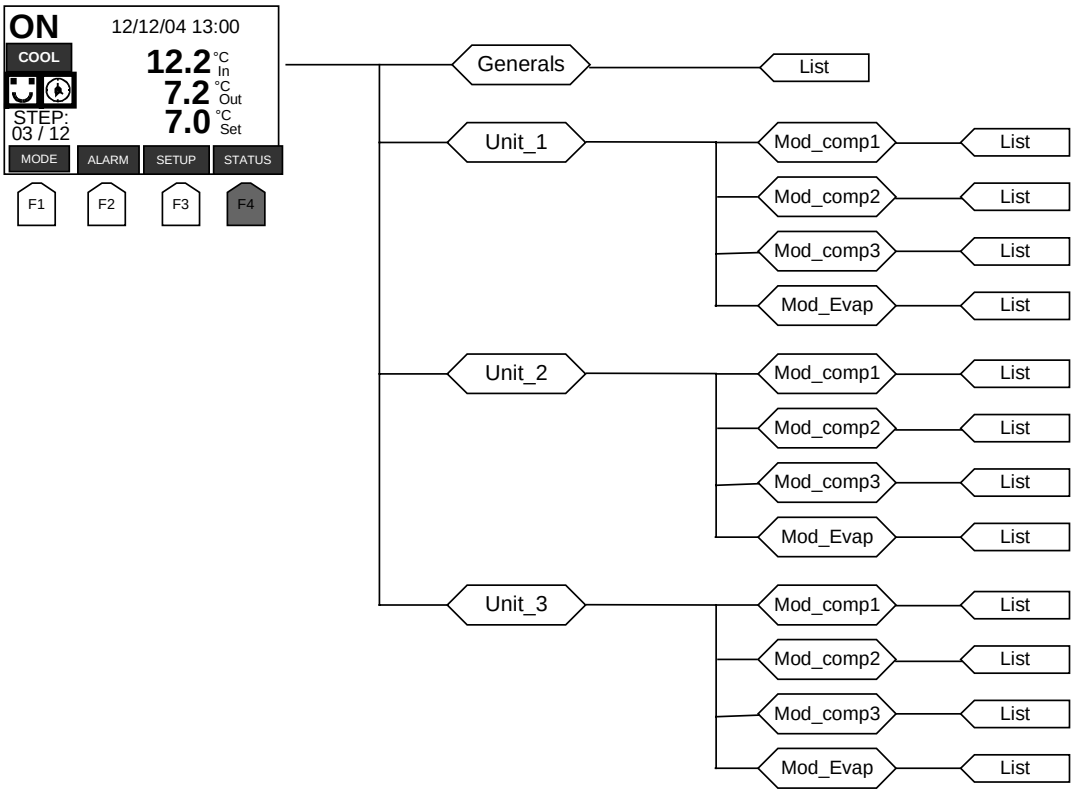


Add	*Code*	*Description*	*UOM*	*Pass*
6/CEN	***Set2EN***	Enable second set point function		1
86/CEN	***MaxSetHeat***	Maximum limit allowed for the heating set point	°C	1
87/CEN	***MinSetHeat***	Minimum limit allowed for the heating set point	°C	1
88/CEN	***MaxSetCool***	Maximum limit allowed for the cooling set point	°C	1
89/CEN	***MinSetCool***	Minimum limit allowed for the cooling set point	°C	1
90/CEN	***SecondSetC***	Second cooling set point	°C	0
91/CEN	***SecondSetH***	Second heating set point	°C	0
118/CEN	***SetCool***	Cooling set point	°C	0
119/CEN	***SetHeat***	Heating set point	°C	0
272/CEN	***SetRecovery***	Recovery set point		
273/CEN	***BandRecovery***	Temperature difference for recovery set point		

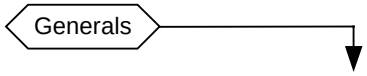


Add	*Code*	*Description*	*UOM*	*Pass*
11/CEN	***MaxCWRC***	Maximum value of water reset correction in cooling	°C	1
24/CEN	***MaxCWRH***	Maximum value of water reset correction in heating	°C	1
75/CEN	***WaterReset***	Enable the Water Reset function		1
102/CEN	***SWRMaxH***	Signal corresponding to maximum correction in heating	%	1
104/CEN	***SWRMinH***	Signal corresponding to minimum correction in heating	%	1
105/CEN	***SWRMaxC***	Signal corresponding to maximum correction in cooling	%	1
108/CEN	***SWRMinC***	Signal corresponding to minimum correction in cooling	%	1

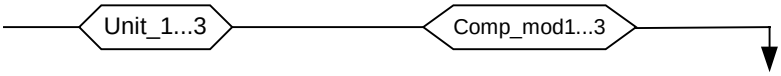
OPERATING STATUS MENU TREE



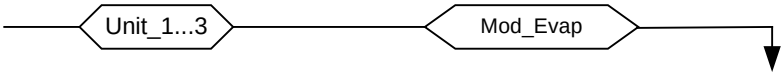
GENERAL UNIT STATUS MENU



Item	Description	***UOM***
Unit status	**ON-OFF status**	
Unit mode	Unit operating mode	
Current set point	Current set point value	°C
Inlet Temperature	Unit inlet temperature value	°C
Outlet Temperature	Unit outlet temperature value	°C
Number of active steps	Capacity-control steps currently active	
Current step offset	Value, calculated by the temperature controller based on the various active compensations, which added to (or subtracted from, in heating) the current set point, defines the temperature threshold beyond which a capacity-control step can be activated.	°C
Step activation time	Scan time for the activation of the capacity-control steps. The temperature controller can only activate steps when the TimeScan (see below) reaches the value indicated here.	
Step count increase	Step activation count increase.	
Outside compensation	Set point compensation, calculated based on the temperature (or enthalpy) of the outside air.	°C
WR compensation	Set point compensation, calculated based on a Water Reset signal from an external device.	°C
Unit compensation	Load compensation calculated by the temperature controller based on the IN-OUT temperature difference (this compensation is added to the step difference)	°C
Start compensation	Load compensation calculated by the temperature controller based on some parameters that define the optimum operation of the compressors. (This compensation is added to the step difference)	°C
Duty compensation	Load compensation calculated by the temperature controller based on some parameters that define the optimum operating cycle of the compressors. (This compensation is added to the step difference)	°C
Outside temperature	Temperature of the outside air	°C
Outside relative humidity	Relative humidity of the outside air	%
FreeCooling valve percentage	Percentage of opening of the freecooling valve	%
Outside FreeCooling ventilation percentage	Percentage of the air flow-rate of any dry cooler connected to the unit with the function of freecooling device	%
FreeCooling valve status	Status of the freecooling On-Off valve	
Pump 1 status	Status of pump 1	
Pump 2 status	Status of pump 2	
Water Reset	Percentage of the Water Reset signal applied to the inlet	%
Demand Limit	Percentage of the Demand Limit signal applied to the inlet	%



Item	Description	***UOM***
Compressor 1 status	**Current status of compressor 1**	
Compressor 2 status	**Current status of compressor 2**	
Compressor 3 status	**Current status of compressor 3**	
Cp 1 timer status	**Status of safety timeouts**	
Cp 2 timer status	**Status of safety timeouts**	
Cp 3 timer status	**Status of safety timeouts**	
Valve 1 c1 status	**Status of valve**	
Valve 2 c1 status	**Status of valve**	
Valve 3 c1 status	**Status of valve**	
Valve 1 c2 status	**Status of valve**	
Valve 2 c2 status	**Status of valve**	
Valve 3 c2 status	**Status of valve**	
Valve 1 c3 status	**Status of valve**	
Valve 2 c3 status	**Status of valve**	
Valve 3 c3 status	**Status of valve**	
Liquid solenoid	**Status of valve**	
Coil temperature	**Value of temperature measured at the coil**	**°C**
Recovery temperature	**Heat recovery exchanger water inlet temperature**	**°C**
Condensation pressure	**Value of condensation pressure**	**Bar**
Evaporation pressure	**Value of evaporation pressure**	**Bar**
Fan status	**Percentage value of flow rate generated by the fans**	**%**
Defrost status	**Current status of defrost function**	
Defrost count time	**Value registering on defrost delay timer**	**Sec**
Compressor 1 operating time	**Total hours operation**	
Compressor 1 OFF-ON cycles	**Total number of starts**	
Compressor 2 operating time	**Total hours operation**	
Compressor 2 OFF-ON cycles	**Total number of starts**	
Compressor 3 operating time	**Total hours operation**	
Compressor 3 OFF-ON cycles	**Total number of starts**	



Item	Description	***UOM***
Tout1	Evaporator water outlet temperature	**°C**
Tout2	Evaporator water outlet temperature	°C
Tinput	Evaporator water inlet temperature	°C
Pump 1 status	*Status of the pump*	
Pump 2 status	*Status of the pump*	
Heater status	*Status of the evaporator antifreeze heaters*	

LIST OF ALARMS

CENTRAL MODULE ALARMS

Code displayed	***Reset***	***Description-actions***
E001 H2O IN temp. probe fault on control module	Automatic	Disable load compensation and freecooling
E002 H2O OUT temp. probe fault on control module	Automatic	Total shut-down – pump on
E003 Outside air temp. probe fault	Automatic	Inhibit associated functions (freecooling – set point compensation - defrost count times)
E004 Water Reset input fault	Automatic	Inhibit WR compensation
E005 Outside RH% probe fault	Automatic	Inhibit associated functions
E006 Thermal cut-out alarm pump 1 on control module	Automatic	See pump management
E007 Thermal cut-out alarm pump 2 on control module	Automatic	See pump management
E008 Flow switch alarm on control module	See pump management	Total shut-down - see pump management
E009 System pressure alarm	Manual	Total shut-down - see pump management
E010 Phase monitor alarm	Automatic	Total shut-down - Pump Off after suitable interval
E011 Antifreeze alarm on control module	Manual	Total shut-down - Pump on
E012 Antifreeze pre-alarm on control module	Automatic (*)	Disable steps
E013 Change pump on CONTROL MODULE	Automatic (*)	Signal
E014 Unit configuration alarm	Automatic (*)	Signal
E015 Demand Limit input fault	Automatic (*)	Signal
E016 Main can net disconnectedness	Automatic (*)	Total shut-down

COMPRESSOR MODULE ALARMS

Code displayed	***Reset***	***Description-actions***
E101 Cond./ Evap. temp. probe fault	Automatic	TypeCE=0; Cooling: signal only, Heating: stop circuit in question (see example)
E102 Condensing pressure probe fault	Automatic	Stop circuit in question (see example)
E103 Evaporation pressure probe fault	Automatic	Stop circuit in question (see example)
E104 Recovery temp. probe fault	Automatic	Disable "compressor module 4-way valve" output (inhibit recovery)
E105 High pressure alarm	Manual	Stop circuit in question (see example)
E106 Low pressure alarm	Automatic	Stop circuit in question (see example)
E107 Fan thermal cut-out alarm	Manual	Stop circuit in question (see example) If the ventilation is in common, shut-down “UNIT-i"
E111 Cond. / Evap. H2O flow alarm	Automatic	TypeCE=1; Stop circuit in question (see example)
E112 High pressure pre-alarm 1	Automatic (*)	HP1Enabled=0: alarm not managed HP1Enabled=1: activate maximum speed of fans in question (see example)
E113 High pressure pre-alarm 2	Automatic (*)	HP2Enabled=0: alarm not managed HP2Enabled=1: disable one compressor in the circuit in question (see example)
E114 Low pressure pre-alarm	Automatic - Manual after NPRELP1hour (*)	LP1Enabled=0: alarm not managed LP1Enabled=1 disable one compressor in the circuit in question (see example)
E115 Force defrost alarm	Automatic (*)	Signal only
E116 Max Press. diff. alarm	Manual	Stop circuit in question (see example)
E117 Recovery H2O flow alarm	Automatic	Stop circuit in question (see example)
E118 Heat recovery HP pre-alarm	Automatic - Manual after NPREHPhour (*)	Inhibit recovery on the circuit in question (see example)
E108 Compressor 1 thermal cut-out alarm	Manual	Stop circuit in question (see example)
E109 Compressor 2 thermal cut-out alarm	Manual	Stop circuit in question (see example)
E110 Compressor 3 thermal cut-out alarm	Manual	Stop circuit in question (see example)
E213 Disconnected module	Automatic	Total shut-down

NOTE
The compressor module alarms have the same identifier on each compressor module in the system. Consequently, to correctly identify which module the fault refers to, see the associated code:

Example:

U2-CMP2 (Alarm Unit-2 / Compressor Module 2)
E105 High pressure alarm
Indicates that the alarm condition is active on Compressor Module 2, Unit 2

EVAPORATOR MODULE ALARMS

Code displayed	***Reset***	***Description-actions***
E201 Evaporator inlet probe fault	Automatic	Disable load compensation and freecooling
E202 Evaporator outlet probe 1 fault	Automatic	Shut-down “UNIT-i” – pump on
E202 Evaporator outlet probe 2 probe fault	Automatic	Shut-down “UNIT-i” – pump on
E203 Programmable evaporator input alarm	Automatic	To be defined according to the associated function
E204 Thermal cut-out alarm, evaporator pump 1	Manual	Shut-down “UNIT-i” – See pump management
E205 Thermal cut-out alarm, evaporator pump 2	Manual	Shut-down “UNIT-i” – See pump management
E206 Evaporator flow switch alarm	Manual	Shut-down “UNIT-i” – See pump management
E207 Evaporator system fill alarm	Manual	Shut-down the entire SYSTEM – See pump management
E208 Change pumps on evaporator	Automatic	See pump management
E209 Antifreeze alarm on evaporator	Manual	Shut-down “UNIT-i” – Pump on
E210 Tout 1, antifreeze pre-alarm on evaporator	Automatic (*)	Disable steps on UNIT-i (see example)
E211 Tout 2, antifreeze pre-alarm on evaporator	Automatic (*)	Disable steps on UNIT-i (see example)
E212 Pump system lockout	Manual	Total shut-down
E214 Disconnected module	Automatic	Total shut-down

NOTE
The evaporator module alarms have the same identifier on each evaporator module in the system. Consequently, to correctly identify which module the fault refers to, see the associated code:

Example:

U2-EVAP (Alarm Evaporator Module 2)
E207 Evaporator system fill alarm
Indicates that the alarm condition is active on Evaporator Module 2

OPERATION OF THE TEMPERATURE CONTROLLER

COOLING

The temperature controller acts by comparing the water outlet temperature to the system (average of the evaporator water outlet temperatures), against the current set point, and considering a number of threshold values.

The temperature controller will tend to deactivate capacity-control steps when the water outlet temperature falls below the current set point

Vice-versa, it will tend to activate capacity-control steps when the outlet temperature exceeds the sum of current set point + the theoretical value of the temperature difference between the water inlet and outlet due to an individual capacity-control step. (This value may differ between compressors, according to the values assigned to the parameters PotC1, PotC2, PotC3) + any offset due to the compensation functions.

NB: The following are exceptions:

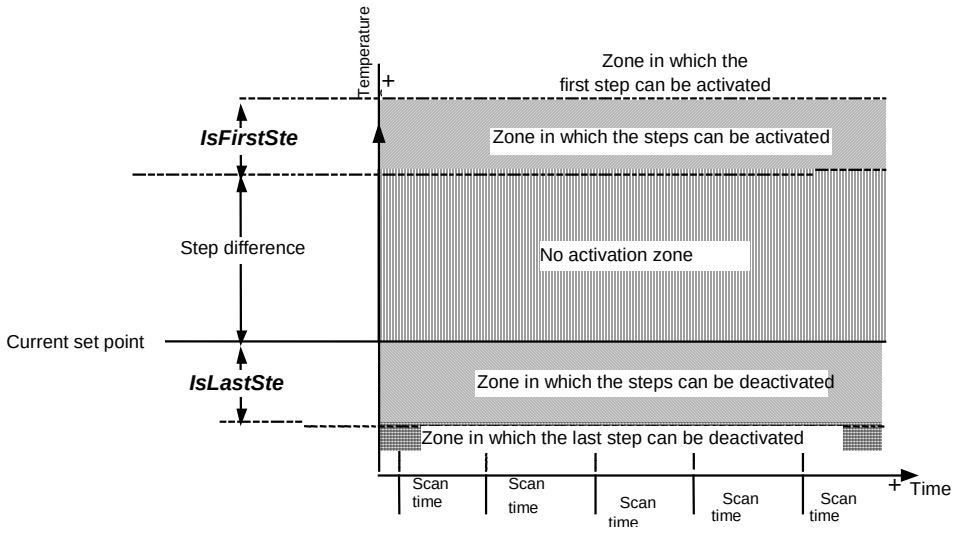
1) Activating the first capacity-control step. In this case, the temperature controller waits for the water outlet temperature to reach the step activation value (see above) + an hysteresis set for the parameter IsFirstStep.
2) Deactivating the last active step. In this case, the temperature controller can deactivate the step only if the temperature falls below the set point by the value set for the parameter IsLastStep.
3) The temperature falls below: current set point – the value of the parameter PreeFree. In this case, all the active capacity-control steps are deactivated, irrespective of the scan time (immediate action). In any case, the compressor safety times are observed.

DETERMINING THE TEMPERATURE DIFFERENCE FOR EACH COMPRESSOR

Parameters involved:

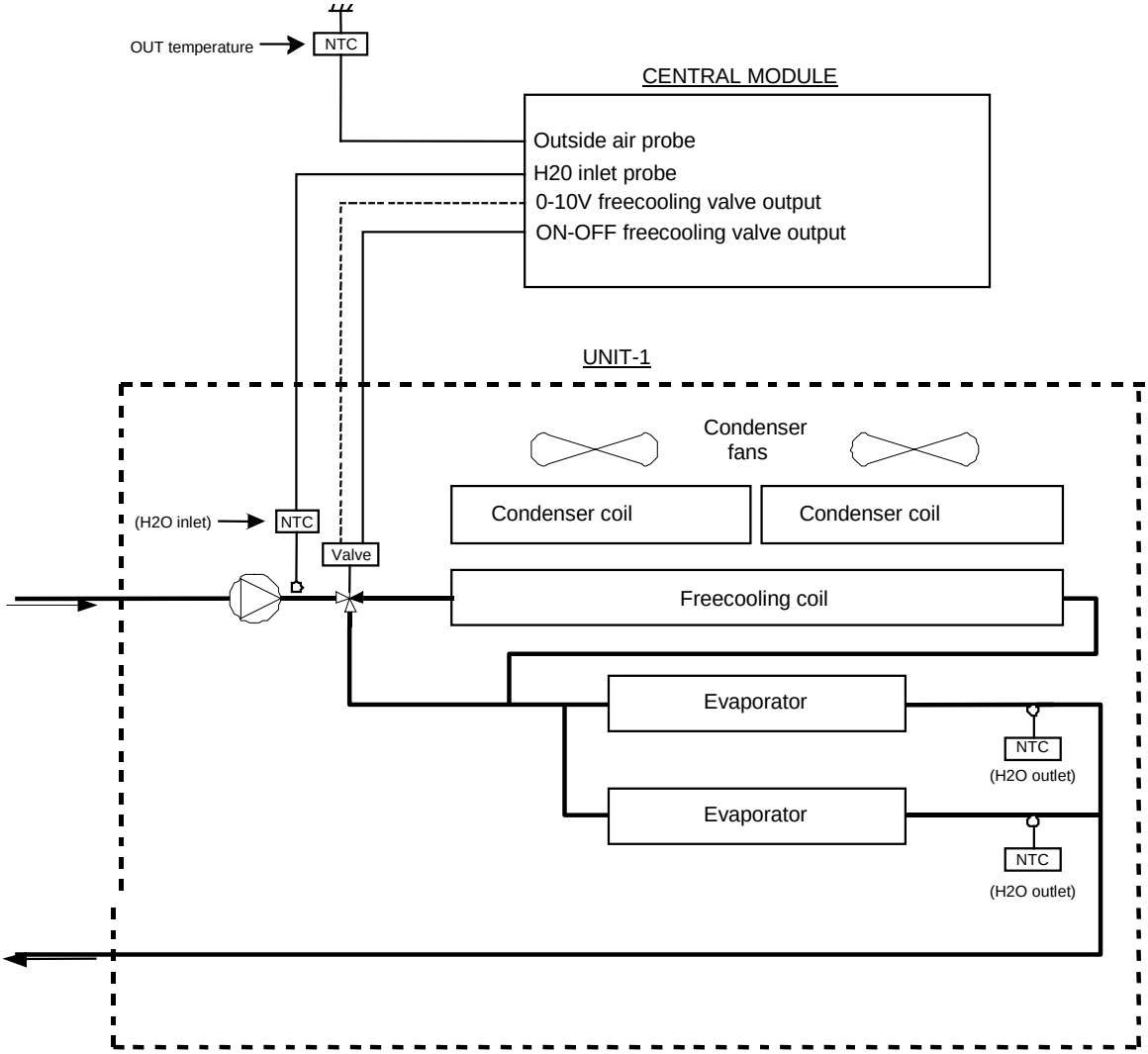
Description	Limits	UOM	Default
Percentage of capacity delivered by compressor 1	PotC1	%	25
Percentage of capacity delivered by compressor 2	PotC2	%	25
Percentage of capacity delivered by compressor 3	PotC3	%	25

The temperature difference due to a compressor will be calculated as follows:
Temperature difference due to C1 = ((PotC1 / 100) * DeltaTC)
Temperature difference due to C2 = ((PotC2 / 100) * DeltaTC)
Temperature difference due to C3 = ((PotC3 / 100) * DeltaTC)

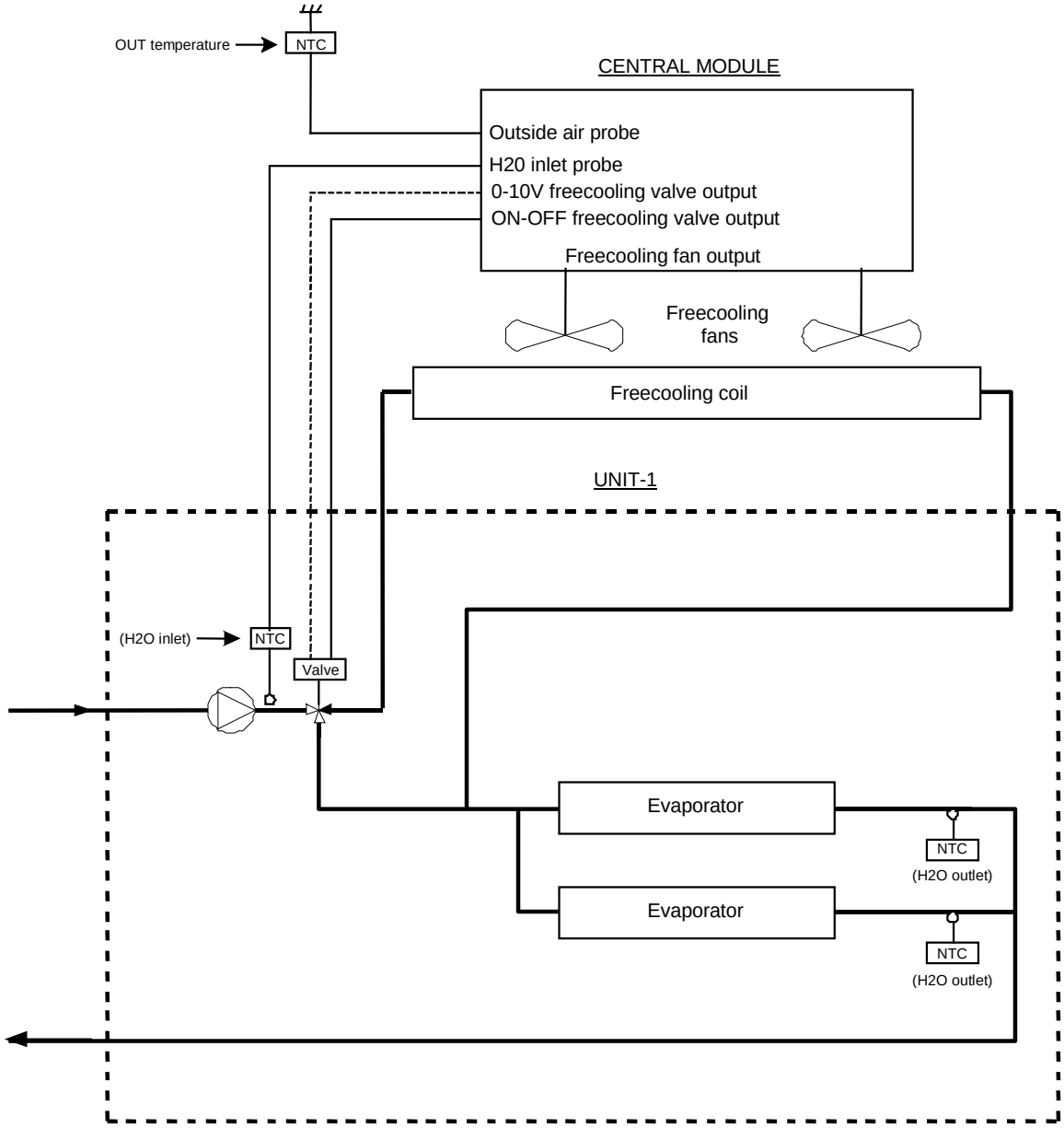


FREECOOLING
There are two different freecooling modes:

INTERNAL: the freecooling coil is located near the condenser coil. During the freecooling phase, the condensing fans (managed by the compressor modules) are controlled according to the average evaporator outlet temperature, as shown below (that is, independently from the configuration of the system).



EXTERNAL: the freecooling coil and fans are installed separately from the unit. They are managed directly by the module using an independent output.



The freecooling phase *<u>is enabled</u>* (starts) if:

a) The temperature of the outside air is less than:

Current set point + ***DeltaFC***.

b) The return water temperature from the system (measured by probe BT1 located at the inlet to the FC coil) is higher than:

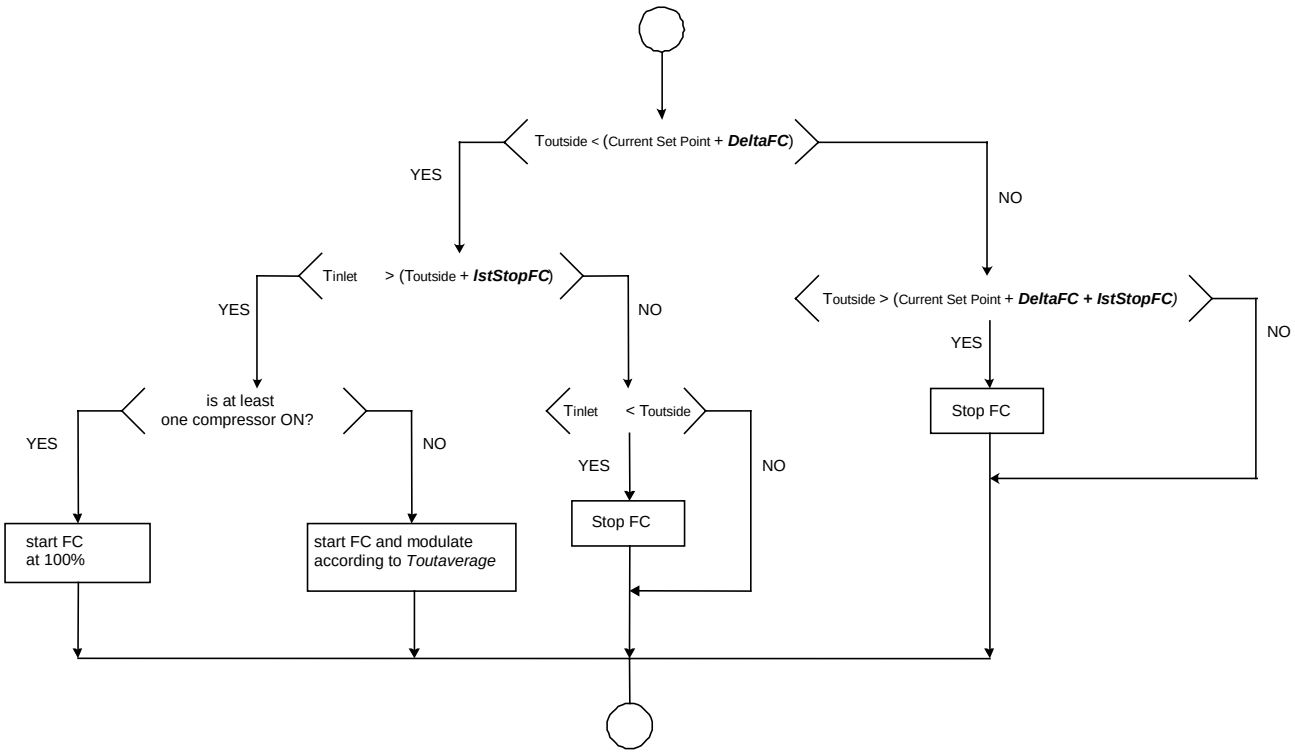
Outside air temperature + ***IstStopFC***

The freecooling phase *<u>is disabled</u>* (stops) if:

c) The temperature of the outside air exceeds:

Current set point + ***DeltaFC + IstStopFC***

d) The return water temperature from the system (measured by the NTC probe located at the inlet to the FC coil) falls below the outside air temperature.



During the freecooling phase, the corresponding valve deviates the flow of water to the freecooling coil, located upstream of the evaporators. At the same time, the freecooling fans are activated according to the average evaporator outlet temperature. In this way, as the outside temperature is less than the return water temperature, the latter is cooled.
In the case of INTERNAL freecooling, the freecooling fans are the same as the condenser fans. Consequently, during this phase only, these fans are operated at 100% if a compressor is active, or alternatively modulate (according to the average evaporator outlet temperature) if no resources are active.
In the case of EXTERNAL freecooling, the freecooling fans are managed by the central module and therefore are completely independent from the condenser.
The control valve, when the freecooling conditions are present, is switched 100% to the FC coil. It only deviates the flow to the evaporator if the average evaporator outlet temperature falls below a threshold value, as described further on.

Freecooling modulation

The capacity of the FC coil is modulated by:

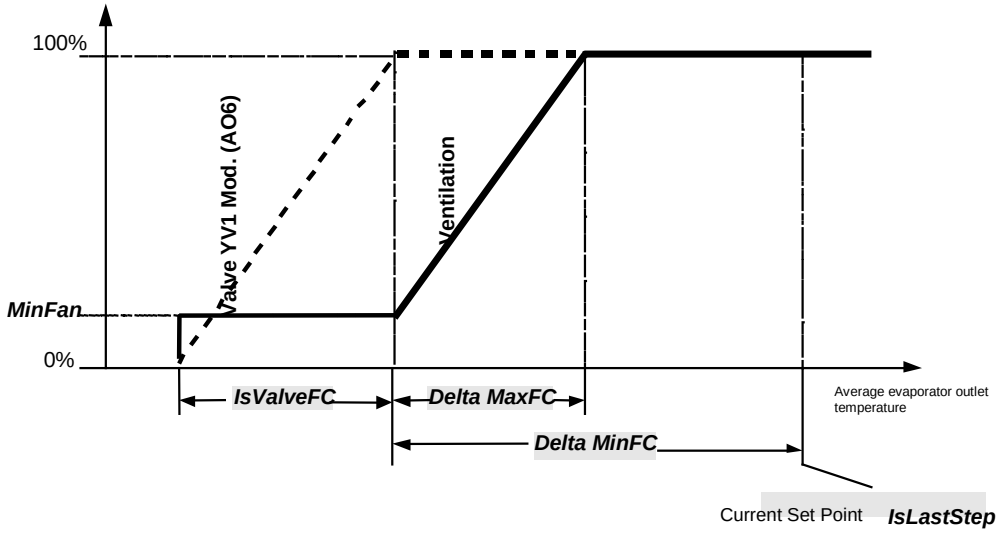
a) varying the speed of the fans
b) varying the percentage of water flow deviated to the FC coil

The modulation of the capacity provided due to freecooling is performed based on the average evaporator outlet temperature, while considering the following limits.

1. When at least one compressor is on, and in any case when the average water outlet temperature is above the step deactivation threshold, freecooling is at the maximum. (Fans at 100% and valve 100% to the FC coil).

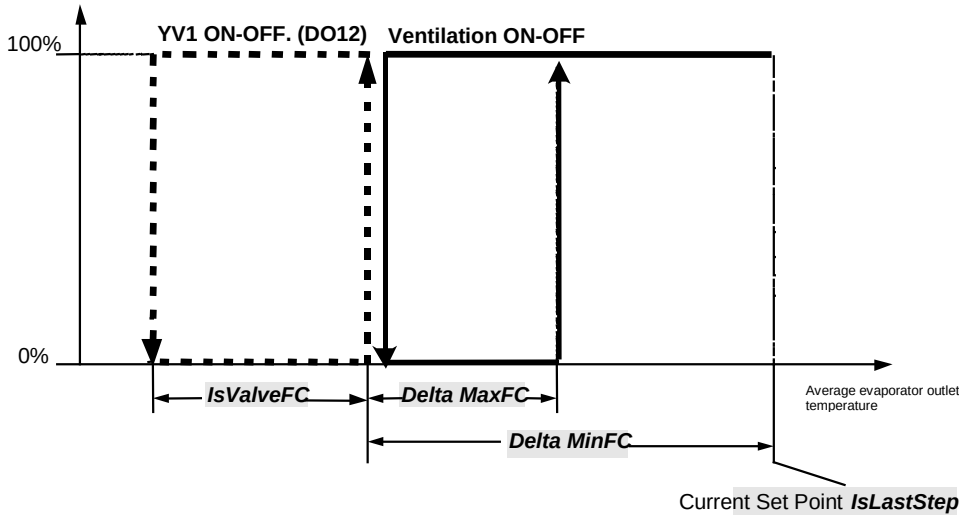
2. When the fans are on, the valve switches 100% to the FC coil.

Explanatory graph



Modulating Valve and Fans

ON-OFF valve and fans



HEATING
The temperature controller acts by comparing the water outlet temperature to the system (average of the exchanger water outlet temperatures), against the current set point, and considering a number of threshold values.
The temperature controller will tend to deactivate capacity-control steps when the water outlet temperature rises above the current set point
Vice-versa, it will tend to activate capacity-control steps when the outlet temperature falls below the difference of the current set point - the theoretical value of the temperature difference between the water inlet and outlet due to an individual capacity-control step. (This value may differ between compressors, according to the values assigned to the parameters PotC1, PotC2, PotC3) - any offset due to the compensation functions.

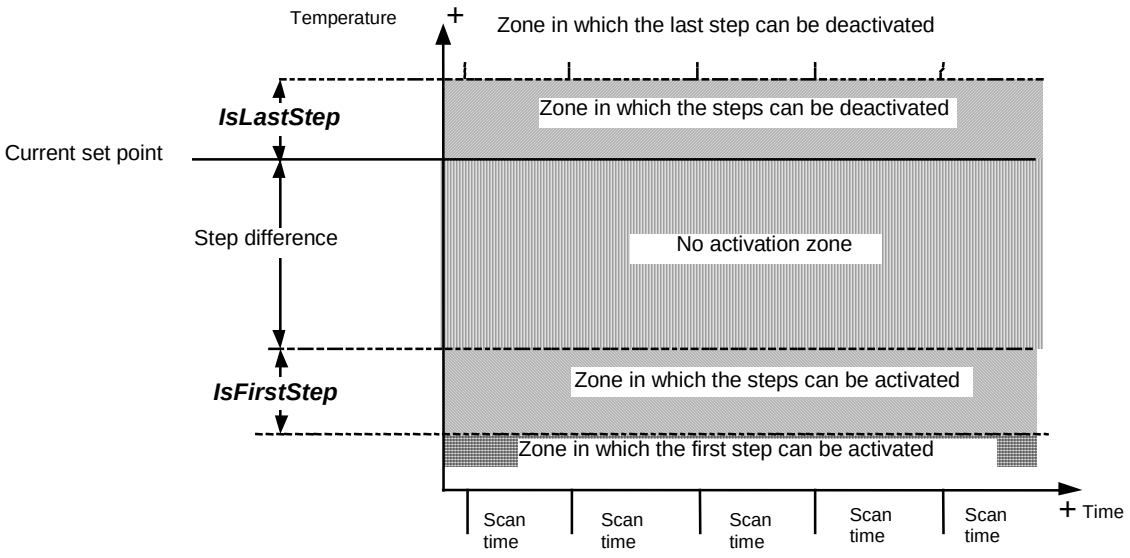
NB: The following are exceptions:

1) Activating the first capacity-control step. In this case, the temperature controller waits for the water outlet temperature to reach the step activation value (see above) - an hysteresis set for the parameter IsFirstStep.
2) Deactivating the last active step. In this case, the temperature controller can deactivate the step only if the temperature exceeds the set point by the value set for the parameter IsLastStep.
3) The temperature falls below: current set point – the value of the parameter PreeFree. In this case, all the active capacity-control steps are deactivated, irrespective of the scan time (immediate action). In any case, the compressor safety times are observed.

DETERMINING THE TEMPERATURE DIFFERENCE FOR EACH COMPRESSOR
Parameters involved:

Description	Limits	UOM	Default
Percentage of capacity delivered by compressor 1	PotC1	%	25
Percentage of capacity delivered by compressor 2	PotC2	%	25
Percentage of capacity delivered by compressor 3	PotC3	%	25

The temperature difference due to a compressor is calculated as follows:
Temperature difference due to C1 = ((PotC1 / 100) * DeltaTH)
Temperature difference due to C2 = ((PotC2 / 100) * DeltaTH)
Temperature difference due to C3 = ((PotC3 / 100) * DeltaTH)



STEP ACTIVATION – SCAN TIMES

The temperature controller can activate one and one only step at a time, and only at the expiry of the activation scan time. At all other times no steps may be activated. The activation scan time is not fixed, but rather varies according to the temperature difference between the water outlet temperature and the current set point. The higher the difference (both positive and negative), the shorter the interval between the scan points.

STEP DEACTIVATION

The active capacity-control steps can be deactivated, one step at a time (except where protected by the safety devices), at the expiry of the time defined for the parameter ***TSRelease***.

COMPENSATION

1) LOAD COMPENSATION

The load compensation function acts by modifying the capacity-control step activation point as the difference between the exchanger water inlet and outlet temperature changes.
It is assumed that the temperature difference is a direct consequence of the extent of the load applied.
The compensation value will be higher (capacity-control step activation point further away from the set point) the lower the temperature difference.
The compensation value will be null (capacity-control step activation point nearer to the set point) at the maximum temperature difference.
The value of the difference between the water inlet and outlet temperature is the average measured over the last (MediaDelta) seconds.

2) DUTY-CYCLE COMPENSATION

The control algorithm estimates the more critical load conditions for the unit, based on the operating times and the frequency of compressor starts. In the event of critical operation, the controller increases the offset in reference to the activation threshold.

3) RUNNING TIME COMPENSATION

The number of compressor starts is counted over a certain interval of time. If the compressor running time is critical (too short), the controller increases the offset in reference to the activation threshold.

SET POINT CORRECTION IN COOLING

The current set point in cooling is defined by the parameter *SetCool* and by the following corrections:

- ***OutsideT correction***: Value of the correction based on the *outside temperature* (between 0 and ***MaxCextC***).

  If the outside humidity probe is present, the correction of the set point will also depend on the factor ***Enthalpy Ext correction*** (between 0 and ***MaxCextC***).

- ***WR correction***: value of the Water Reset correction according to the *external signal* (between 0 and ***MaxCWRC***).

The current set point will therefore be defined as follows:

Current set point = SetCool + OutsideT correction + WR correction

In any case, the value calculated in this way is automatically limited between the two values set for the parameters ***MinSetC*** and ***MAXSetC***, that is:

MinSetC > *current set point* < ***MAXSetC***

SET POINT CORRECTION IN HEATING

The current set point in heating is defined by the parameter *SetHeat* and by the following corrections:

- ***OutsideT correction***: value of the correction based *on the outside temperature* (between 0 and ***MaxCextH***).

- ***WR correction***: value of the Water Reset correction according to the *external signal* (between 0 and ***MaxCWRH***).

The current set point will therefore be defined as follows:

Current set point = SetHeat + OutsideT correction + WR correction

In any case, the value calculated in this way is automatically limited between the two values set for the parameters *MinSetH* and *MAXSetH,* that is:

MinSetH > current set point < ***MAXSetH***

SECOND SET POINT FROM DIGITAL INPUT

Two different set points can be used, depending on the status of digital input **2Set**. The following parameters are used.

Description		***Limits***	***UOM***	***Default***
Enable second set point 0 = NO 1 = YES	***2SetEn***	0 ÷ 1	Flag	0
Second set point in Cool	***SecondSetC***	MinSetC ÷ MaxSetC	Num	8
Second set point in Heat	***SecondSetH***	MinSetH ÷ MaxSetH	Num	35

HARDWARE:
The digital input connected to the terminals (**J1-6 / J1-7)** will be used to enable the operation of the unit with the second set point. By connecting a switch or other device with voltage-free contact to the input in question, the following situations are possible:
Contact **open**, **COOLING or HEATING set point** enabled
Contact **closed**, **second set point** enabled

NB: The change in status of the second set point enabling contact must remain stable for at least 10 seconds before the changeover becomes effective.

DEMAND LIMIT

Enabling the DEMAND LIMIT function limits the capacity delivered so as to contain the power consumed by the unit.

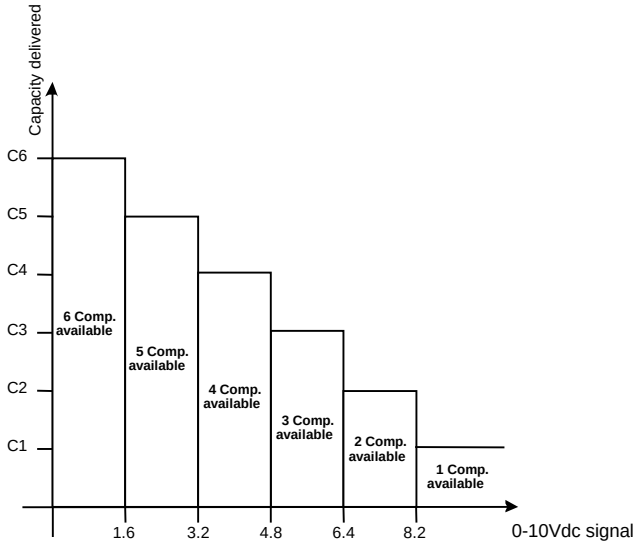
Configuration parameters:

Description		***Limits***	***UOM***	***Default***	***Pass***	***Add.***
Enable demand limit	***DemandLimitEn***	NO - YES	Flag	NO	1	
D.L. reaction time	***TReation***	0 - 999	Sec	5	1	

Control logic:
The number of compressors available to the unit to satisfy the heating or cooling requirements is determined based on a **0-10Vdc / 4-20mA** signal connected to the **Demand Limit** analogue input. The higher the value of the signal, the less capacity will be available to the system, as highlighted in the graphs below.

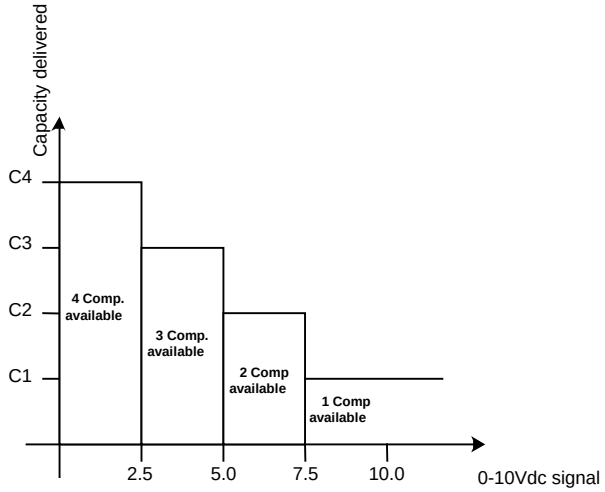
EXAMPLES

UNIT WITH 6 COMPRESSORS



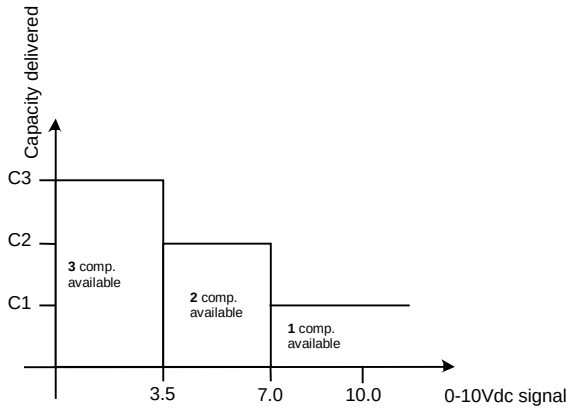
NOTE
As the 0-10Vdc/4..20mA signal changes, to avoid unwanted and continuous changes in the number of resources available to the temperature controller, a time = ***"Treation"*** is considered, in which the signal must remain stable above the step activation or deactivation threshold before modifying the percentage of capacity available to the system.

UNIT WITH 4 COMPRESSORS



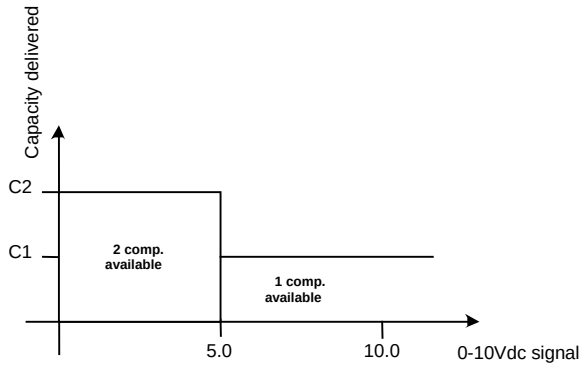
NOTE
As the 0-10Vdc/4..20mA signal changes, to avoid unwanted and continuous changes in the number of resources available to the temperature controller, a time = ***"Treation"*** is considered, in which the signal must remain stable above the step activation or deactivation threshold before modifying the percentage of capacity available to the system.

UNIT WITH 3 COMPRESSORS



NOTE
As the 0-10Vdc/4..20mA signal changes, to avoid unwanted and continuous changes in the number of resources available to the temperature controller, a time = ***"Treation"*** is considered, in which the signal must remain stable above the step activation or deactivation threshold before modifying the percentage of capacity available to the system.

UNIT WITH 2 COMPRESSORS



NOTE
As the 0-10Vdc/4..20mA signal changes, to avoid unwanted and continuous changes in the number of resources available to the temperature controller, a time = ***"Treation"*** is considered, in which the signal must remain stable above the step activation or deactivation threshold before modifying the percentage of capacity available to the system.

The examples shown above refer to a voltage signal, however the Demand Limit function also features the same logic of linearity when the analogue input, suitably configured, is connected to a 4-20mA device.
In addition, all the possible system configurations with a maximum of up to 18 compressors per unit can be contemplated.

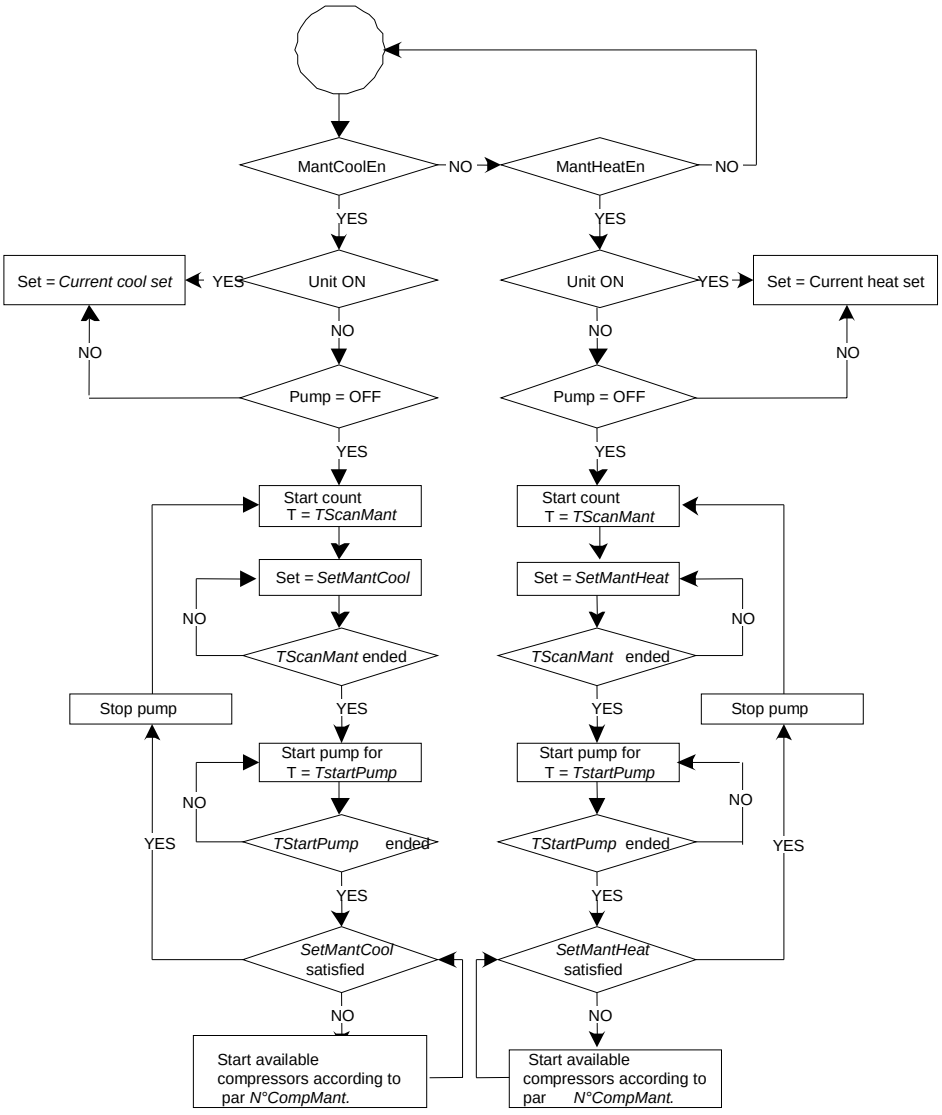
NOTE
The operator can read, in the status menu, the number of compressors available due to the Demand Limit function as the analogue signal used changes.

MAINTENANCE SET POINT

The unit can be enabled to operate with a MAINTENANCE set point, which controls the water temperature even when the unit is OFF or in Standby.

The following configuration parameters are used:

Description		***Limits***	***UOM***	***Default***	***Pass***
Enable Maintenance in Cool	***MantCoolEn***	0 ÷ 1	Flag	0	
Enable Maintenance in Heat	***MantHeatEn***	0 ÷ 1	Flag	0	
Maintenance set point in Cool	***SetMantCool***				
Maintenance set point in Heat	***SetMantHeat***				
Maintenance scan time	***TscanMant***				
No. compressors in Maintenance	***N°CompMant.***	1 ÷ 4	Num	1	
Pump start time	***TstartingPump***				



RESOURCE MANAGEMENT ALGORITHM

The steps are activated following the request from the temperature controller according to the following rules:

BALANCING OF THE CAPACITY DELIVERED
The algorithm chooses the compressor to be activated based on the thermal demand in reference to the following distribution logic.

- Capacity delivered by the circuit
- Balancing of the starts
- Balancing of the operating hours

Note
For the same “wear” (Operating hours/Starts), the system tends to activate the circuits so as balance the capacity between the various circuits that make up the system.